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**Vol. VII. NEW YORK, JANUARY 23, 1886. No. 4.**

IN some of the new buildings in this city there is no gas pipe, the entire dependence for illumination being placed on incandescent lamps, for which the wires have been run. This is a notable advance, yet one that should create no surprise. Light for light, electricity is safer and purer than gas, and just as cheap. A wire circuit from a central station is as reliable as a mile or two of piping connected with gasometers, and a good isolated plant under one's own control and care is infinitely preferable to a remote source of gas supply.

PERHAPS there is no one question which we are more frequently called upon to solve than that relating to the resistance of telegraph instruments. Many (amateurs, evidently) cannot see how an instrument having a resistance of say 5 ohms will give no signal, whereas one of 20 ohms does, and notwithstanding the fact that the current is greater in the former case. From the constant repetition of the question, we are led to the belief that the spread of elementary text-books of electricity has not yet reached its ultimate limit by any means.

THE preferred stock and deferred dividend scheme proposed to the New England Telephone Company, consequent upon the conference between its directors and the parent company, does not appear to be hailed with any great amount of enthusiasm by the stockholders. Complicated plans of this nature seldom win very loud applause, even though they may have some good features; and one of the troubles with the New England Company has been this tendency to adopt intricate schemes of settlement that settle nothing and please nobody.

AN endeavor has been made lately to create a scare in Chicago by representing the Socialists there as in a state of readiness for riot and rapine. The Socialists are said to be armed and drilled, and to be able to use electricity also for the accomplishment of their designs. Thus, "besides the bombs, the Socialistic leader referred mysteriously to the possession of infernal machines which explode by clockwork or electricity." And again: "In a manhole in the centre of the street, it is proposed to place, to be exploded by electricity, one of the largest machines in use." The leaders profess, too, to be in possession of perfect plans of the underground system of Chicago. Are the local electricians socialistic in their views, or are the Socialists electricians?

AT a well-known college in New York one of the professors is said to have remarked to the members of his class, that if any of them should happen to invent something, they should look through German books on the subject, as there they would find a very good description of their invention. We are reminded of this story by the "Reclaimer" which Mr. Geo. B. Prescott, Jr., makes in our columns for Mr. Weston, as the inventor of the electric speed indicator. In this case the tables are turned on our German friends, who might with profit have studied our Patent-Office files. Still, there is nothing strange in this occurrence. Every inventor will at one time or another have devised something which to him appeared original, but which upon subsequent examination turned out to be anticipated, if not entirely, at least in part, by earlier inventors.

WE publish in full the text of Secretary Lamar's decision in regard to the desirability of a government suit that shall determine the validity of the Bell patent; and with the decision we give also the comments of various persons more or less intimately concerned. It cannot be said that the decision comes as a surprise, as reports were freely circulated last week to the effect that the Secretary was about to do as he has done. What the result of this decision will be it is somewhat difficult to anticipate, but at the moment it looks as though activity will be greatly stimulated in the telephonic field. In fact, Prof. Gray has already got a new telephone company in full swing in Chicago, and other interests here at the East are displaying like energy in their own behalf. Meantime the Bell people profess full faith in their ability to meet the new attack, and to keep the business to themselves, at any rate until the validity suit has been settled. So far, Bell stock has not declined as greatly as might have been expected.

THE rude awakening of Nebraska's "Sleeping Beauty," who enjoyed her hystero-cataleptic sleep for seventy days, was far less romantic than the experience of the original Sleeping Beauty, who was awakened by a prince. In Nebraska's modern case it was only an electric battery that aroused the slumbering beauty, but it was enough. So our beautiful traditions are fading before the practical influence of electricity, and sleeping beauties, spooks and hobgoblins, treated to an application of a dynamo, fade like a summer's dream. It is only three or four years since a host of Arabs on a pilgrimage to Mecca, reverently following their Sacred Carpet, which was hoisted on a kind of Ark of the Covenant, were horrified to see the Blessed Rag torn to tatters by becoming entangled with the prosaic telegraph wires that stretched across the desert. In connection with this interesting subject we might recall the curious fact that, while poetical stories and superstitions are falling back before the march of electricity—a force which the immortal Morse did so much to raise—it was his direct ancestress, Elizabeth Morse, who, in Boston in 1680, was actually condemned to death on the charge of witchcraft, and who only escaped through the efforts of influential friends.

IT is rumored that after mature consideration the New York Subway Commissioners have decided upon a system for placing the wires under ground, and that their decision will shortly be announced. It would not be difficult to point out the system which has been fixed upon, but we refrain from forestalling the commission in the announcement of its conclusions. Whatever system be adopted, it is highly desirable that its control should be independent of any existing company, owning, or interested in the ownership of, lines. With *one* company in such absolute control, it is difficult to see how complication and misunderstanding can be avoided. In order to be perfectly safe in the matter of providing equal and unbiased accommodation for each user of a system, the latter should be in the hands of independent parties. We are led to make the above remarks from the fact that recent events indicate that the danger above alluded to is imminent. If this precaution is not taken, it is safe to predict that the burying of the wires will be delayed indefinitely. No company owning wires and competing with another company in business will feel safe in intrusting its wires to the care of a rival, and the restrictions and obligations which may be imposed by the company operating the underground system may make the change from overhead to underground anything but a profitable one, except to those in control.

WHILE the study of the electro-motor for comparatively large power has been the subject of continued investigation with a view to the improvement of its efficiency, the small, "domestic" motor, as it may be called, has been sadly neglected. Not that many changes in form have not been brought about, for our columns bear witness to the contrary; but these changes of form can hardly be said to have been a very great improvement from the electrical and economic stand-point. It cannot, of course, be expected that a small machine will be as efficient as a large one, but there is nothing in the nature of the problem which seems to warrant the large difference in efficiency which exists between the two extremes of large and small, as constructed at the present time. Most of the small motors are run by batteries, a limited number having within recent years, been put on dynamo circuits, but it is safe to say that they rarely return in mechanical work 20 per cent. of the electrical energy absorbed, and in many cases the efficiency is far less. This assertion is based on the results of a long and careful test of most of the small motors now sold, and points out the advisability of treating the small motor in the same manner as the large one, *i. e.*, subjecting it to a thorough scientific treatment and experiment. We shall, on some future occasion, have more to say on this subject, merely stating for the present that the subject we have drawn attention to is now under active treatment by a very well known and able electrician, whose results we hope to publish in due time.

AN anonymous writer in the New York *Sun*, who signs himself "Engineer," attempts to show in a number of puerile arguments that the scheme for an underground electric railway in this city is impracticable. The writer has evidently chosen a false pseudonym, or is at best a very timid engineer, as he bewails the possibility of various occurrences, which, if likely, would put an end to all tunnel building. He pictures the dire distress of the passengers at the disabling of a train, and says naively: "We all are aware of the possibility of a motor on wheels being temporarily disabled." At this bold rate the London underground roads would still be a thing of the future instead of a splendid realization, so far as rapid transit is concerned. Ventilation also seems to bother "Engineer" considerably, and he has evidently taken the London case as an example here, whereas in the main argument he has entirely ignored its existence and success. The question of ventilation does not nearly approach in importance to that of others to be considered. "Engineer" seems to forget that the only vitiating influence to be counteracted is the exhalation from the passengers. Electricity being employed there will be no smoke, no gas flames and their products, so that a very small amount of ventilation would be adequate. But granted even that the plan of ventilation proposed should prove insufficient, a very simple remedy by auxiliary means can readily be applied. We might take up "Engineer's" criticisms in detail, but those above mentioned are sufficient to show that they could hardly have emanated from an engineer in any way worthy of the name.

THE Postal Telegraph scheme seems to be languishing, poor thing, and even at this early part of the session of Congress, it is safe to infer that that enormous job has been taken in and done for—at least for the session. The National Administration is best able, if so disposed, to "reach" every hamlet in the country through the Post Office Department, in which 53,000 postmasters of every grade can be organized to act as one man. The immense increase in this tremendous force which the telegraph business would necessitate, does not now have the allurements for some Republicans that it once had. Many Democrats opposed the stupendous job on constitutional grounds, and, although it might open up an inviting vista of great political strength for them, they cannot for consistency's sake advocate its adoption. The remaining advocates of a "paternal" government can now get time to study up Prince Bismarck's latest plan—he would cut down the "poor-rates" to a minimum, by *compelling* laborers to insure themselves. It cannot be denied that there is some element of good in the Iron Chancellor's scheme—and, for the matter of that, in the American Postal Telegraph scheme also—but the good accruing is liable to blind a free people to the dangerous principle that gave it birth. For a people to subordinate private rights—those "inalienable rights" referred to by the Declaration of Independence—to what is alleged to be the public good, and for a people to establish a monopoly to crush out the butcher, the baker and the candlestick-maker, or any other private industry, is simply a government, scorpion-like, stinging itself. There can never be a monopoly of the telegraph in this country; and the rivalry of private companies is to-day doing more to lessen the cost of telegraphing than a government monopoly could do.

### Two Electric Light Ordinances for Kansas City.

Two electric light ordinances have been introduced and referred to the Kansas City Council Gas Committee for examination. They are considered of vast importance by the members of the council.

The first grants to Messrs. J. H. Reid and H. S. Wicks the right to establish, construct and maintain electric light works for illuminating purposes, and to construct their lines above ground or to lay down pipes and conductors through the streets and public grounds of the city. It also grants the right to take up pavements on such streets, alleys, public grounds, etc., as may be necessary, but provides that the work shall be done under the direction of the city engineer in such a manner as to least inconvenience the public; that said sidewalks or pavements shall be replaced in as good a condition as before, with all convenient speed.

Nothing in the ordinance is to be construed so as to absolve the electric light company from any legal liability on proceedings to restrain or abate any nuisance arising from their operations, nor for liability from injury resulting from the negligence of the company.

The ordinance further provides that the company shall execute to the city a bond of $10,000, to indemnify the city against personal damages, etc., by neglect of duty.

The construction of the works is to commence within twelve months from the passage of the ordinance and the company is to complete the laying down of two miles of street mains and have the same ready to supply electric light in two years thereafter unless enjoined by some proceedings in law and equity.

It is further provided that when any line shall run along or through any public park one arc light or ten incandescent lights shall be placed in such park free of charge and maintained without expense to the city.

The company agrees to use the Weston system of arc and incandescent owned and operated by the United States Electric Light Company, which system is already in use in the United States Custom-house and Post-office in Chicago, Cincinnati, New York, Philadelphia, and many hundreds of public buildings.

The second ordinance grants to the Sperry Electric Light, Motor and Car Brake Company, of Illinois, the right to construct and operate an electric light plant in the city for twenty years after the passage of the ordinance, and for the erection of poles, wires, etc., on the public streets. The poles are to be set under the direction of the city engineer. The company agrees to indemnify the city against damages.

### Muirhead's Improved Cable Duplex System.

It has been found practicable to establish and maintain a balance on short cables (up to 500 miles) without using the bridge wires, by merely adjusting the capacity of the condensers $C_1$ and $C_2$ relatively to each other. But Mr. Muirhead has since discovered that on very long cables, such as those recently laid between Canso in Novia Scotia and Waterville in Ireland (the Mackay-Bennett cables), that it is insufficient and extremely difficult to effect and maintain in practice a sufficiently close balance by merely having the condensers, $C_1$ and $C_2$ (sending condensers) adjusted for capacity. In order to effect a balance sufficently exact for the purpose of obtaining the greatest possible speed of working, it is necessary not only that the capacity of the condenser, $C_1$, placed between the key $K$, and submarine cable $C$, should be of the required ratio to that of the condenser $C_2$, between the key and the artifical cable $A\ L$, but also that their times of charging and discharging should be the same.

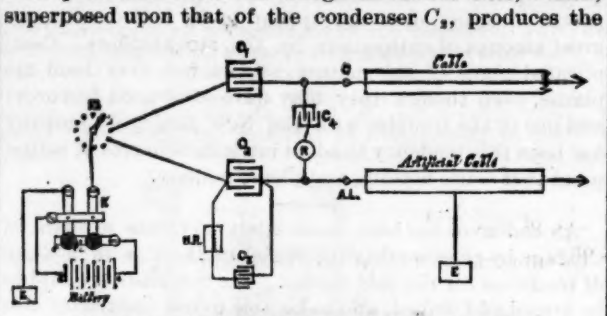
As it is practically impossible to construct or build up a number of sets of large condensers, even out of exactly the same materials, so that their rates of absorption of charge shall be the same throughout, Mr. Muirhead resorts to the following device, which is shown in the figure, and for which we are indebted to the London *Electrical Review*.

A rheostat $Rh$, of low resistance (¼ ohm) is interposed between the signaling key $K$ and the condensers $C_1$ and $C_2$. The cable $C$, and the artificial cable $A\ L$, are connected with these condensers in the manner shown, and a condenser $C_4$ and receiving instrument $R$ are inserted in the circuit between the real and artifical cables.

$B$ represents the battery, and $E$ the earth. To one of the two condensers, say $C_2$, is attached another and supplementary condenser $C_3$, which is subdivided into small parts, and inserted between one terminal of it and one terminal of $C_2$, is a set of coils, marked $H\ R$ in the diagram, of high resistance (say of from 1,000 to 200,000 ohms); the other terminal of $C_3$ is connected by a simple wire with the corresponding terminal of $C_2$, as shown.

In effecting the balance, the artifical cable $A\ L$, is first of all made electrically equal to the cable $C$. The condensers $C_1$ and $C_2$ are then inserted, and their capacities adjusted by means of a subdivided condenser $C_3$. After obtaining in this way the nearest balance, a slight increase is made in the capacity of $C_3$, say by .1 microfarad, and by trials the amount of resistance required in the resistance coils $H\ R$ is ascertained. This produces a flow of charge in the circuit of $C_2$ and $C_3$, together equal to that flowing into the condenser, $C_1$.

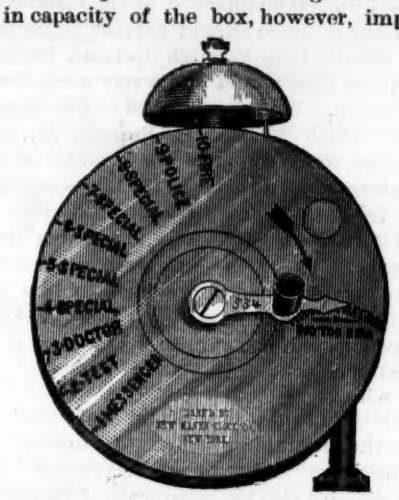
By way of illustrating and explaining this improved method of balancing, the conditions required in balancing one of the above-mentioned Mackay-Bennett cables may be mentioned. They are as follows: On the northerly of the two main cables, $C_1$ is equal to 120 microfarads, $C_2$ to 120 microfarads. $C_3$ to .15 microfarad, and the resistance in $H\ R$ 107,000 ohms. In this case, the combination of the small capacity in $C_3$, with the resistance of the coils $H\ R$ produces a flow of charge of slower rate, which, superposed upon that of the condenser $C_2$, produces the same effect upon the differential arrangment as the charging and discharging of the condenser $C$.




MUIRHEAD'S NEW CABLE DUPLEX SYSTEM.

### A New Ten Call Messenger Box.

The large increase which has taken place in the application of the messenger call system bids fair to make it one of the leading systems of which electricity is the soul. Beginning with the simple single messenger call, the boxes for fire and police were soon added, until now we find as many as ten calls provided for in a single box. With the increase in capacity of the box, however, improvements have also taken place in the mechanism employed, so that difficulties formerly met with are now obviated. Thus in old forms of boxes there was no method by which the sending of a false call could be prevented when by inadvertency the pointer was turned too far beyond the required point on the dial. For instance, if the pointer were put to "police," when a "messenger" was wanted, there was no help for it and the false signal would be transmitted.



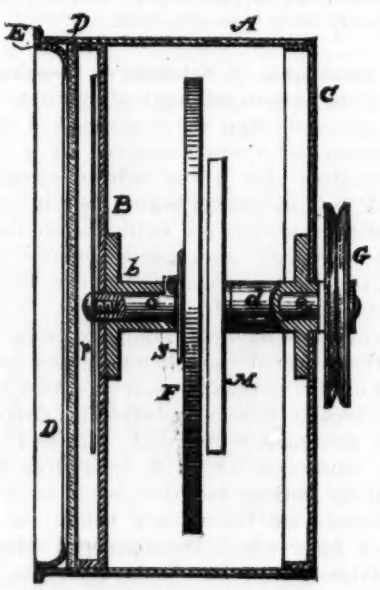

A NEW TEN CALL MESSENGER BOX.

While this occurrence was not so liable to happen with a box containing a few calls widely spaced, it is evident that with a large number of closely spaced calls the occurrence may be quite frequent.

In order, therefore, to remove this difficulty the ten-call messenger box, shown in the accompanying engraving, has been designed by the New Haven Clock Company of this city.

In this box the escapement is controlled by a lever attached to the rod, provided with a push button at its lower end, as shown. The rod has a vertical play of about one-quarter of an inch, and when the pointer is set to a signal it remains there stationary. To send the signal the button is pushed up its full play and the signal is transmitted.

If now the pointer has been moved too far, or something has occurred so that the signal need not be sent, the pointer can be brought back to the right call, or to its position of rest without giving any signal at the office. In order to explain this we must state that a small upward motion of the button and rod releases the escapement so that the pointer revolves; but by depressing the button again when the pointer has arrived at the right call it stops, and any mistake can thus be easily rectified. But some means must evidently be provided for preventing any signals being sent while this correction is going on, since the break-wheel follows the motion of the pointer. This is accomplished in a very ingenious manner by the following means:




WESTON ELECTRIC SPEED INDICATOR.

When the button is depressed, a spring finger situated near the end of the button rod presses against a contact and forms a shunt around the break-wheel, short circuiting the latter so that a continuous circuit is presented to the current, whether the wheel revolve or not. Evidently, under these conditions, no signal can be transmitted. Now, when the button-rod is raised only a short distance, its end does not reach the spring-finger which still maintains its contact, and consequently, although the wheel and pointer revolve, no signal is sent, as the circuit remains unbroken. But when the button-rod is pushed full up it separates the spring-finger from its contact, so that the only course for the current is through the break-wheel, and under these conditions the signal is transmitted.

This ingenious box is made in a most substantial manner, all the pinions of the wheel trains being of cut steel. It is also provided with a return signal, so that the caller is notified of the reception of his call.

### Electric Speed Indicator—A Reclaimer.

An ingenious speed indicator recently devised by Dr. Th. Horn, of Leipsic, Germany, and described by the inventor in a late issue of the *Elektrotechn. Zeitsch.*, is the subject of an interesting note in THE ELECTRICAL WORLD of December 19th, 1885. This note is reprinted in the January 1st number of the London *Telegraphic Journal and Electrical Review*.

The instrument referred to is based on Arago's experimental demonstration (1824), that a revolving copper disc causes a magnetic needle placed above it to rotate in the same direction. A speed indicator acting upon this same principle was invented by Mr. Edward Weston in the latter part of the year 1882, and is the subject of U. S. patent No. 277,179, granted May 8th, 1883.

The specific form of indicator described in Mr. Weston's patent is herewith illustrated, and consists essentially of a centrally pivoted disc of copper $F$, and a small, flat bar magnet or needle $M$, close to the face of the disc and free to revolve about the same axis. The magnet being caused to rotate in unison with the body whose speed of revolution is required, tends to carry the copper disc around with it with a force practically proportional to such speed. A spiral spring $S$, similar to the hair spring of a watch, attached to the pinion $C$, supporting the copper disc, tends to oppose the motion of the disc as induced by the magnet. An index or pointer $P$, moving over a graduated dial $B$, is suitably arranged on the disc. The patent states, also, that either the disc or needle may be revolved, and that any equivalent of the spring may be employed.

This brief description shows clearly that the only difference between Dr. Horn's recently invented indicator and the indicator patented by Mr. Weston several years ago is that, whereas, in the former instrument the disc, or rather its equivalent, the ring revolves, and the directive force of the needle is obtained from a magnet, in the latter instrument the needle revolves and the directive force of the disc is supplied by a spring.

I have often protested against American inventors claiming everything under the sun, and Germany has not, certainly, such an abundance of inventive genius that she can afford to part with honors of that sort with impunity; but in the present case, with evidence in the shape of letters patent before my eyes, I am impelled to make a reclaimer for "Our Country."

GEO. B. PRESCOTT, JR.

WESTON LABORATORY, Newark, N. J., Jan. 13, 1886.

### Producing Cane Sugar from Starch by Electricity.

This method, due to L. Aubert and V. Giraud, of Lyons, depends upon the formation of saccharose from starch and water by a practical method which is substantially as follows: 100 kilograms of potatoes are heated to 100° C. in 5 cubic metres of water, with 5 kilograms of sulphuric acid, and a trace of nitric acid, until the starch is dissolved. An electric current of 11 ampères is then passed through the solution between electrodes of antimonial lead, the direction of the current being changed at intervals. In about two hours' time the solution is tested with tincture of iodine and alcohol, and if no coloration or precipitate is produced the current is interrupted, and carbonate of lime and hydrate of lime, the latter in considerable excess, are added to remove dextrine and unchanged glucose. Previously to filtration and saturation of the lime with carbonic acid, some basic acetate of lead is added to remove the coloring matter, which otherwise would interfere with the crystallization. After concentration of the liquid in the usual way, the syrup is allowed to crystallize, which however takes somewhat longer than ordinary sugar syrup.—*Abst. Proc. Inst. C. E.*

### Telegraphers in Siam.

Under date of November 27th, A. Field, one of the American operators working for the Siamese Government, writes an interesting letter from Bangkok. It goes far to dispel the idea that the lot of the American operator there is not a happy one, and flatly contradicts a letter written last Fall by Martin J. Dixon, another American operator, who has since returned. "Regarding the expense of living," says Mr. Field, "Mr. Dixon boarded at one of the best hotels in the city, for which he paid $60 per month for himself and wife. An extra meal would have cost him one tical (60 cents). His salary was $120 and an allowance of $24 in lieu of house rent, or $144 per month.

"The Frenchmen he speaks of as receiving $195 per month are M. Berthelier, Secretary of the Department, and M. Berland, Chief of Service. They are the only Frenchmen in the Telegraph Department in Bangkok, and I presume they receive even larger salaries than stated by Dixon, as they hold responsible positions and are gentleman of ability who give honor to their position. I believe it is customary for chiefs of departments to receive larger salaries than clerks, and I dare say Mr. Dealy, Manager of the Western Union office in New York, receives at least two shillings, if not half a dollar, more than a city line operator. The statement that the French considered us cheap labor and would have nothing to do with us is utterly false. On the contrary, it would have been impossible for any one to do more for us than they have done."

### Prof. Kohlrausch's Galvanometers.

Notwithstanding the large number of forms which the galvanometer has taken, the tangent galvanometer will, without doubt, continue to be employed in preference to any other, when absolute measurements are undertaken. Our illustration, Fig. 1, represents the galvanometer of Prof. Kohlrausch, as constructed by Hartmann and Braun, and designed for heavy currents. The large turned ring of copper is 400 mm. in diameter, 4 mm. thick and 8 mm. wide; the ring is cut and the ends are connected by a strip of ivory. Two straight strips of copper are joined to the

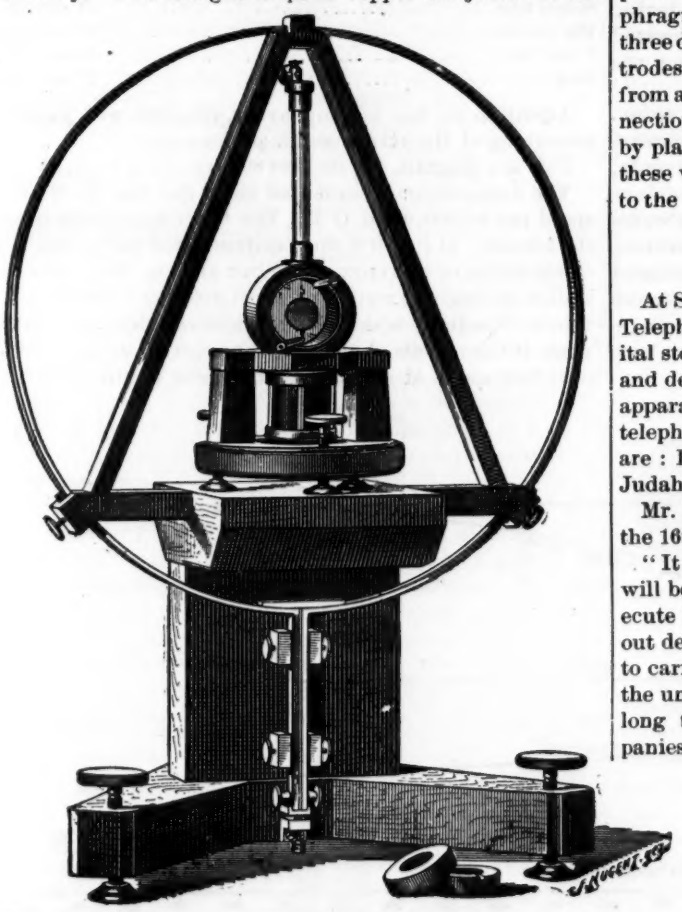


FIG. 1.—KOHLRAUSCH'S TANGENT GALVANOMETER FOR HEAVY CURRENTS.

ends and separated by a thin sheet of mica placed between them. They are then pressed together by two ebonite screw clamps. The whole is mounted on a wooden tripod. To ascertain the mean diameter of the coil it is measured on several conjugate axes by means of a test circle or comparator. For rough measurements the mirror magnetometer can be replaced by a large needle and index.

For the measurement of very weak currents, Professor Kohlrausch has devised the instrument shown in Fig. 2. In this the needle, as shown in the detail accompanying, consists of a magnetized mirror, 18 mm. in diameter, suspended in an elliptical bobbin of wire, so that the suspension fibre is not too short. The interior diameters of the ellipse are 30 and 60 mm., and the length of the bobbin is 30 mm. The length of the suspension fibre being 20 mm., the coefficient of torsion is only .001.

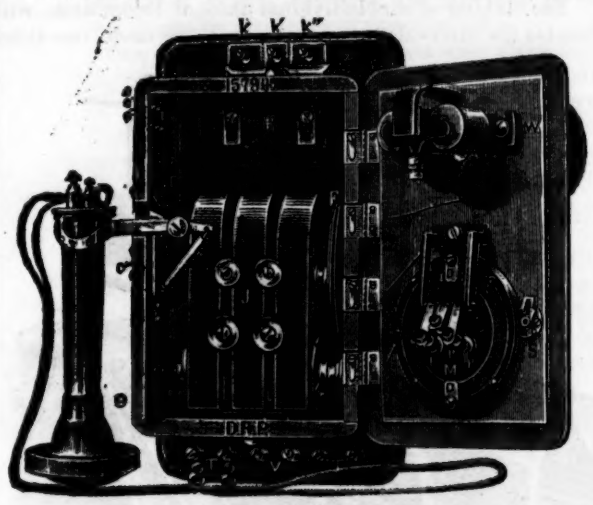
The instrument is arranged for variable dampening by means of a copper cylinder. When the latter is pushed full in, so as to completely surround the mirror, the maximum effect is obtained, and any less degree of dampening can be obtained by withdrawing the cylinder to the desired position. There are two pairs of windings on the galvanometer coil, ranging in proportion as 1 : 10, so that four degrees of sensibility can be obtained in the ratio of 1, 2, 10 and 20. The resistances of the coils vary from 0.5 to 3.0 ohms.

Both these galvanometers have recently been imported by Messrs. Queen & Co., of Philadelphia.

### Berliner's Three-Contact Microphone.

For a number of years Mr. J. Berliner, well-known in telephone circles in this country, has devoted himself to the development of his system in Germany. He has lately introduced a modified form of his microphone in connection with the ordinary Bell instrument, as used in this country.

Our illustration, taken from the *Elektrotech. Ztsch.*, shows



BERLINER'S THREE-CONTACT MICROPHONE.

this new three-contact microphone attached as usual to the door of the magneto box. It consists of a diaphragm of hard rubber *M* inserted in a flat cast iron ring, and resting on an India rubber washer *G*. The hard rubber diaphragm is held fast by two ears *D D*, placed at opposite points, and in such a manner that the rest of the diaphragm is free to vibrate. Attached to the diaphragm are three carbon buttons upon which bear three pendulum electrodes *P P' P''*. As shown, the latter are loosely suspended from a stirrup *a*, which is screwed to the cover. Connection with carbon buttons and with the circuit is made by placing pieces of sheet zinc under them and connecting these with a thin strip of copper which is led and clamped to the iron ring.

### A New Telephone Company.

At Springfield, Ill., on the 16th inst., the Gray National Telephone Company, of Chicago, was licensed. The capital stock is $2,000,000. The company is to manufacture and deal in telephones and other electrical instruments, apparatus and appliances, and to construct and operate telephone and other electrical lines. The incorporators are: Elisha Gray, Nelson E. Swartout and Noble B. Judah.

Mr. D. K. Tripp, Prof. Elisha Gray's attorney, said, on the 16th, referring to the new company:

"It will be a Chicago enterprise, and the headquarters will be here. The object is to protect Prof. Gray and prosecute his case. The organization will be perfected without delay. The local company will be very nicely situated to carry on business, as Prof. Gray and his associates own the underground conduit already in, and it will not take long to put in a complete telephone system. Sub-companies will be organized throughout the country on the same general plan as those now in existence. Whatever results from this controversy the people cannot help being greatly benefited by getting a better service at a cheaper price. I take it that the people of this country would be perfectly willing to have the man who has made the laws of nature flexible to his will receive not only the praise and the honor but financial results from such a magnificent invention. In short, we intend to prosecute Prof. Gray's rights through to a final adjudication, if necessary before the Supreme Court of the United States, and we have ample capital to do it with."

"If you open exchanges in Chicago," was asked, "and elsewhere, will not the Bell people apply for injunctions?"

"It is the opinion of eminent attorneys that, in view of the pending suit on the part of the Government to test the validity of the Bell patents, the United States Court would not interfere if bonds were given. We haven't the slightest fear of the outcome."

### An Underground Wire System for New York.

A dispatch from Chicago of Jan. 16 says:

"It is well known that the Electrical Subway Commission of New York, who were appointed to devise a system of underground wires for that city, paid a visit to Chicago several weeks ago and made a thorough examination of the underground system which is partially in operation here, studying it in connection with those in use in Washington and Philadelphia. Messrs. Loew and Hess were here for some time engaged in this business, and although they kept their operations as quiet as possible, it is no more than natural that some of their proceedings have leaked out. It is now reported here by persons who have the best of opportunities for learning the truth of the matter that the commission has virtually arrived at a decision and settled upon a system to be adopted for the city of New York. That system is practically the one in operation here, and known as the Dorsett system. It is understood that a company has been formed already, and that a large amount of capital has been invested for pushing the scheme to bury the wires in New York.

"That is the appearance of things on the surface, but it is probable that in due time the fact will be disclosed that the real corporation which is to place the wires under ground in New York is the Western Union Telegraph Company, and that the system will be owned and controlled by Mr. Jay Gould and his friends. The understanding seems to be that even if the new company's propositions are accepted by the commission, which it is considered certain that they will be, though the name of the company is not known, it will promptly sell its franchise to the Western Union or to such persons as the directors of the Western Union may designate. It would appear, therefore, that the entire underground electric system of New York City is destined within a short time to fall into the hands of the Western Union Company or its owners, and thus tighten the grip which this great monopoly already has upon that city."

On being asked if this were true, Mr. Moss, the secretary of the New York Commission, denied its correctness, and said: "I know nothing about any such scheme. I should imagine that one of the first duties of the commission would be to see that there was no monopoly in the acceptable plan for putting the wires underground. I certainly understand my duty to be such, and I am sure my colleagues feel likewise in the matter. You may say from me that there will be no monopoly of the business given to the Western Union Company."

Notwithstanding the denial of Mr. Moss and the equally emphatic statement of his colleague, Mr. Jacob Hess, there can be no doubt as to the truth of the Chicago dispatch. Two of the commissioners, Messrs. Moss and Hess, have practically agreed to lend the weight of the commission's indorsement to what Mr. Moss would call a "perfected plan," which is to combine the merits of patents owned in whole or in part by Mr. Moss' son-in-law, Maurice B. Flynn. The system to be adopted does not involve all or even a majority of the points of the so-called Dorsett system, but some of the patents have been bought through Mr. Flynn's agency, and he has added others, covering some of the best features of many of the plans

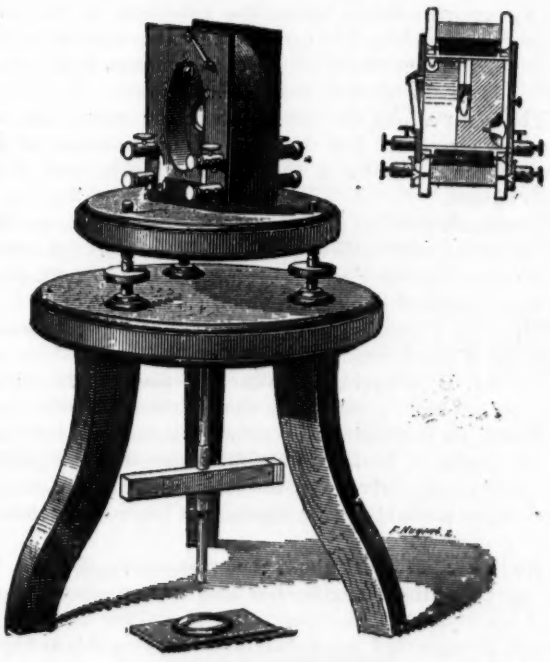


FIG. 2.—KOHLRAUSCH'S GALVANOMETER FOR WEAK CURRENTS.

which have been filed with the Subway Commission. With these patents Mr. Flynn and his friends, it is claimed, have formulated a system for putting the wires underground that will meet the approval of both the commission and the public. A company is in process of formation which will, it is said, include, besides Mr. Flynn, some few of the owners of patents who would not sell outright, and three or four friends of Messrs. Flynn, Hess and Moss. Charles E. Loew, the third member of the commission, is said to have declined to be a party to the scheme. It is even said that Public Works Commissioner Squire will be permitted to have a representative in the company, but not until he quits his public office. Mr. Squire, as Commissioner of Public Works, will be the man to whom any company will have to go to get the necessary permit to open the streets. In all the discussion on the subject of the proposed company, nobody expects to see in the list of persons interested bona fide directors or stockholders. "Dummies" may be put in, as they have been put in other enterprises.

There is some doubt as to whether the new company will be formed in the interest of the Western Union Company or not.

### A Novel Underground System.

Among the plans presented to the Underground Wire Commission of this city, are those of Mr. J. M. Jagel, also of this city. His system, as illustrated in the accom panying engraving, contemplates the construction of two arched subways so that wires carrying strong currents shall not inter-act upon those designed for the telegraph and telephone. These subways, made of cast iron, bolted together in sections, are designed so as to support rails for street cars. At the side of the latter there will be noticed an opening which runs the entire length and is covered by a water-tight strip. The width of the opening is three inches, and through it all wires and cables are let into the conduits and can be drawn any distance by the aid of pulleys shown in the engraving. By tapping the conduit at the side, wires can be taken out at any point, as will be seen.

### Application of Electricity to Propulsion of Elevated Railroads.*

BY FRANK J. SPRAGUE.

(*Continued.*)

Two ways, however, remain by means of which the capacity of the roads can be increased; one, by increasing the number of cars in a train, provided it can be done without increasing the weight of the tractive engine, or if it can be distributed and the train remain under perfect control; another, by increasing the mean running speed. Increasing the length of the train will not produce any very much greater strain on the structure, because the columns are only 43 feet apart, and the cars are about 46 feet long, so that the weight of a dozen cars would not increase the shearing or tensile strains beyond that due to two cars; the period of such strain of course would be somewhat lengthened, but this is immaterial if the elastic limit be not reached. The longitudinal vibration due to this cause will be increased, but if we can do away with the vibration caused by the locomotives the total vibration would be much less. It is the shearing and tensile strains between the colums that we must be careful not to increase. To get a higher speed of the trains it is probably necessary to increase the power, and at the same time to increase the traction. This increased traction, however, must be distributed; it cannot be put at any one point.

It is not practicable to materially increase the number of trains during commission hours, because they run nearly as closely as can be now to make their running time.

We see, then, that steam locomotion does not present many opportunities to better the condition of the road. Hence we are obliged to turn to some other method of locomotion, and that which promises the most satisfactory solution is an electrical system.

I have for a long time been elaborating such a one, and am now convinced that this is the future method of propulsion for the trains of the elevated roads, and it is a near future.

In the substitution of one system by the oth er on these roads, what is the object sought? Ultimately, of course, it is to get a greater return for a given investment, and it is to be obtained in one or more of three ways.

First. By decreasing the coal expended per passenger carried, if this is practicable.

Second. By reducing the wear and tear of the motive power, but more particularly that of the road-bed.

Third. By increasing the carrying capacity of the roads.

The saving of labor I do not think one of the objects to be particularly striven for, the safe handling of passengers and trains probably never requiring a less number than are now necessary.

Much has been said about the great saving of fuel. The work of the present engines has been much underestimated, and consequently the expenditure of coal per horse-power much exaggerated, some statements making this as high as 20 to 25 lbs. per horse-power hour. This is a most serious mistake, and one of which no engineer or electrician should have been guilty. On the contrary, the present engines, considering the conditions under which they are used, show a remarkably high efficiency, for while on duty 20 hours, and with steam admitted to the cylinder for 6 hours only, they show a horse-power per hour developed for an average expenditure of about six pounds of coal. Under the best conditions they must be developing a horse-power with only about five pounds of coal. I will show later on the expenditure in detail, from which it will be seen that the saving in coal is not the chief object. In a proper electrical system there will be, as I will show, a very material decrease in coal expenditure, but I repeat this is not primarily the object to be sought.

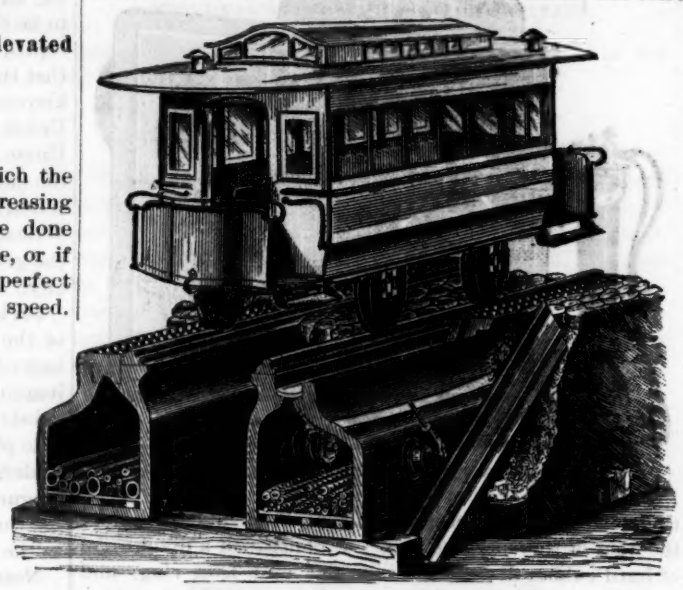
It is evident that if any decrease in the wear and tear of the superstructure can be accomplished a great saving will result.

By a system of electrical propulsion the power can be distributed underneath the cars—every car, or two cars if need be, being a unit—and at the same time arrangements can be made for propelling five or six cars under simultaneous control.

By distributing the power under the car, the whole weight of the car and passengers can be made effective for traction, such traction weight being six times as great as is afforded by the present locomotives. This will enable the cars to be started more promptly, brought to speed more quickly, and stopped in shorter intervals, increasing the mean rate of speed, and thereby the capacity of the road.

Weight is the necessary practical adjunct for traction. The elevated roads present a peculiar problem. To attempt to solve that problem by replacing the present locomotives by electric locomotives of lighter weight, or even of the same weight, is to shut our eyes to plain mechanical and engineering truths, and does not advance by one single step such solution.

The making of cars individual units of locomotion will enable the intervals between trains to be made one-third



NOVEL UNDERGROUND SYSTEM.

of the present schedule for a large part of the time. This would greatly increase the number of passengers during the day and night who would make use of the elevated roads, and this, too, without materially increasing the running expenses.

Another important advantage will be the great reduction in the vibration and wear and tear of the superstructure by distributing the weight so much more evenly. The weight upon the lattice girders between columns would always be less than two-thirds, sometimes only one-third, that now existing, the vibration, tensile and shearing strains being in nearly the same proportion. The motion of the moving parts being rotary the train would start more smoothly, and the motive power be less liable to derangement. Slipping or skidding, such as is now common both in starting and stopping, would be unknown.

The objects thus far indicated as attained are important, and some of them would be very instrumental in the accomplishment of that most immediate and pressing object, the increasing of the carrying capacity of the road without reducing the time schedule.

This must be done, even if the operating expenses are increased. I am glad to say that it can be done with a decrease of these. It is a problem requiring some thought. There has been a great deal of Keelyism in connection with this subject. So much has been said about the ease with which the elevated trains could be operated by electricity, so many promises have been made, so many unreliable statements have found their ways into the press, that people have been led to believe that the change from the steam to an electrical system of locomotion would be quickly and readily made, and I must confess my own opinion that some of the projectors of electric railways have reckoned without their host, and have very much underestimated the character of the work which they have undertaken to perform.

Let us see what power is actually developed on the Third avenue road during commission hours. I will investigate the distribution of the power on this road in such detail as is necessary to show clearly what is going on there, and I have made a number of mathematical determinations, to which I invite your attention. Through the courtesy of Chief Engineer Robert I. Sloan, of the Manhattan Company, I have been allowed a profile sketch of the Third avenue road, from which I get much of my information.

The work of the engines on the elevated road may be divided into three parts:

1st. That necessary to overcome the train's inertia, to start it from rest and raise it to its mean maximum running speed is deduced from the mathematical formula $\frac{w v^2}{2g}$ in foot lbs., where

$v$ = velocity in feet per second;
$w$ = weight in pounds;
$g$ = value of gravity (32.2).

2d. The work of lifting the train from level of low to that of higher grades. This is $W H$, where $H$ is the total height through which weight $W$ is lifted.

3d. The work of traction. This is obtained by using .004 as the factor of traction, or 8 lbs. per net ton, which is a fair allowance for good rolling stock. This traction is only considered as exerted on level and up grades, less the traction during the period of slowing to stop. On down-grades the energy of falling is more than sufficient for traction.

The main line of this road, from South ferry to Harlem, is 8.48 miles long. The following are details of this line, not including the branches at City Hall, Thirty-fourth, and Forty-second streets:

| | | |
|---|---|---|
| Length of line | 8.48 | miles. |
| Total lift, up grade, up track | 144.42 | ft. |
| Lineal distance for same | 13,160. | ft. |
| Total lift, up grade, down track | 137.60 | ft. |
| Lineal distance of same | 16,510. | ft. |
| Level on each track | 15,100. | ft. |
| Number of stations | 27 | |
| Number of stoppages | 26 | |
| Number of stations at which stops are made at level or up grade, each track | 20 | |
| Average times: | | |
| Single trip | 42 | minutes. |
| Per station | 97 | seconds. |
| Under way | 80 | seconds. |
| Stop | 17 | seconds. |

Attention to the accompanying diagram will explain something of the actual engine performance.

This is a diagram for the first 800 feet, on a level.

The distance run is measured along the line $O X$—the speed per second along $O Y$. The latter scale is ten times the former. $O P C B$ is the resultant speed curve, and is a combination of two curves. When getting away from a station an engine exerts for a short distance a nearly continuous traction, which soon begins to decrease, until, when it has run about 130 feet, it has gotten up to a trifle over half speed, at which time it is doing its full work per

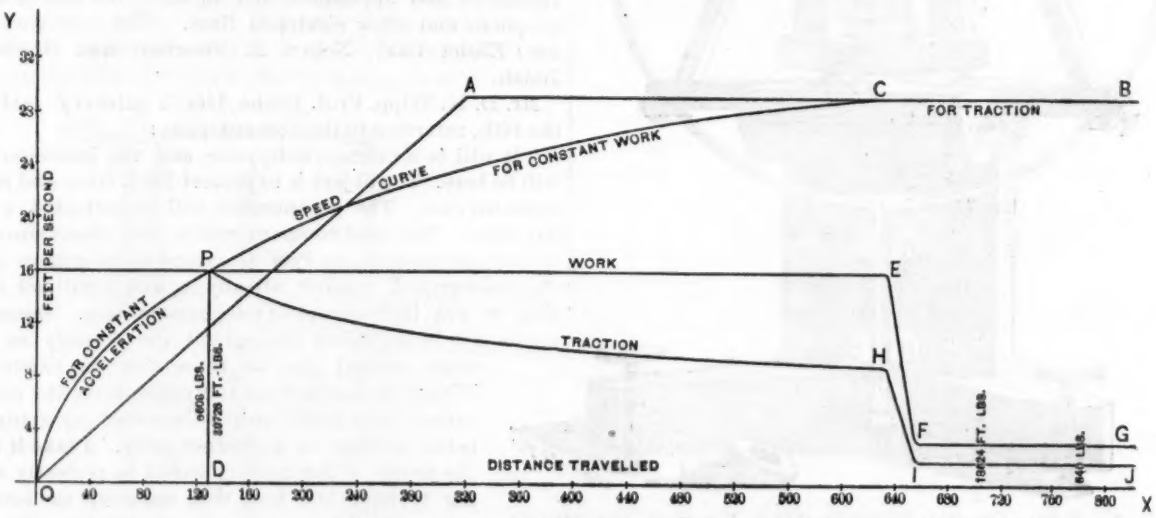



DIAGRAM OF ENGINE PERFORMANCE.

second, this work being expended in accelerating the speed of the train, and in traction.

This part of this curve $O P$, then, is for a nearly uniform acceleration of speed of about one foot per second, and extends over a lineal distance of about 130 feet, and about 16 seconds of time. The engine now working to its full capacity, the curve from $P$ to $C$ is a curve of decreasing acceleration, the work remaining the same until the maximum speed is reached at $C$. This I find to be about 29.1 feet per second, and is reached about 625 feet from the station.

From $O$ to $P$ the work gradually increases; at $P$ it becomes constant, and so remains as long as the speed is accelerated, that is, to $C$, as represented by line $P E$.

When the full speed is reached the work suddenly falls off, as does the traction, because energy is no longer stored up in the train, but simply expended in traction. This continues until within about 289 feet of the station, when brakes are applied and the train is brought to a rest. This distance of 289 feet, about once and a half the length of a train, the maximum speed obtained, the distance traveled over, and the running time between stations are mutually dependent.

(TO BE CONTINUED.)

*A Paper read before the Society of Arts, Boston, Mass., Dec. 10, 1885.

## Some New Experimental Electric Apparatus and Appliances.

We have recently had occasion to witness some novel experiments with apparatus which may be made to demonstrate a great many laws of electro-statics and induction, and which ought to form a part of the physical apparatus of every school and college.

The various objects described below have been devised by Professor James D. Culp, and consist first in a novel disposition of the condenser in connection with the induction coil. Our illustration, Fig. 1, shows the various constituents assembled for use, Fig. 2 being a diagrammatic view of the various parts. As will be seen, they consist es-

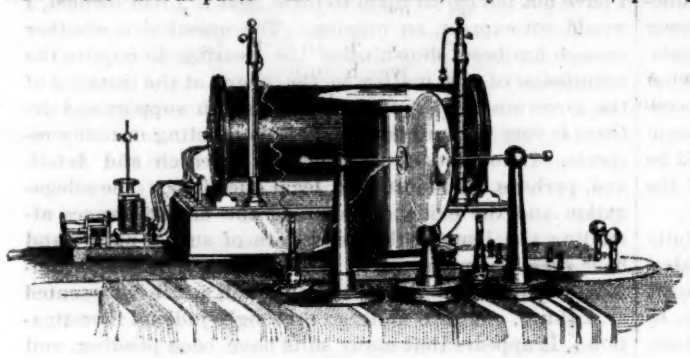


FIG. 1.

sentially of an induction coil and contact breaker, and a so-called "accumulator" of novel design.

The latter is constructed in two principal parts. The inner part, shown in section in Fig. 3, consists of a hard rubber case, containing a compact bundle of rolled sheets of hard rubber which have been covered on one side with sheets of tin-foil somewhat smaller than the rubber sheets. The rubber sheets are about fifteen inches wide by 120 inches long, and are rolled together so as to form a coil in such a way that the two layers of tin-foil are separated. This bundle, or coil, is then inclosed in the hard rubber case, the lower end of the case being secured in an insulated platform of wood.

The outer case, which is larger in diameter than the inner one by about two inches, has a *single* layer of insulated wire wound around the inside thickness of hard

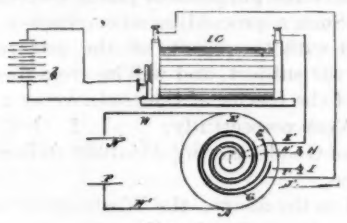


FIG. 2.

rubber of which it is composed, as shown at *E*, Fig. 4. This wire coil begins at about one-quarter of the height of the case and is wound about one-half the length of the same, ending at about three-quarters of the height. The ends of this wire extend to two binding-posts, one on top of the case and the other on the outside platform on which the case rests.

A wire of between No. 32 and 36 is generally used. If a sheet of tin-foil is used instead of the wire coil an intense heat will be developed at the terminal points, and the conducting wires will not be luminous. If larger wires be used than the numbers mentioned, a short, thick spark will pass a short distance between the terminal points, and the conducting wire will not be luminous. The platform on which the outer case rests has an aperture in the centre large enough to permit the inner case to pass

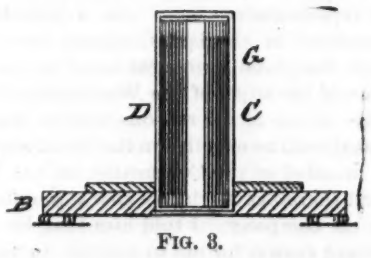



FIG. 3.

through. On the platform there are several binding-posts. From one of these posts a wire runs down across the bottom, so as to come in contact with the inside end of the sheet of tin-foil of the inner cylinder, and then returns upon the opposite side to another binding-post, where it terminates in an adjustable air-spark terminal.

Another wire, starting from another binding-post, also descends across the bottom, and is made on its way to the opposite side of, to come in contact with the sheets of tin-foil referred to, nearest the outside of the coil, whence it passes up to its binding-post, where it terminates in another adjustable terminal. The discharge of the two sheets of tin-foil is only through the air-spark terminals, as the sheets of tin-foil do not touch one another in the coil, nor do the two wires just alluded to come in contact with the same sheets of tin-foil.

In Fig. 2, *I C* represents the induction coil with circuit-breaker *a*, and the primary wire of which coil is charged by a battery *b*. The wire-terminals of the secondary coil pass to the two sheets of spirally wound tin-foil *G G* and thence to the air-spark terminals *H* and *I*, while the coil of wire surrounding the tin-foil condenser is shown at *E*, from which the wires *W W*¹ are let off and terminate in discs *N P*.

If the adjustable air-spark terminals at *H* and *I* are placed in contact with each other, a continuous closed circuit from the induction-coil would be formed by means of the wires $K^1$ $H^1$ and $J^1$ $I^1$ and no effect would be produced by the accumulator. By adjusting the air-spark terminals with their points some distance apart, the electrical current is interrupted and the electricity will begin to accumulate upon the sheets of tin-foil in the case *C*.

This accumulation of electricity upon the sheet of tin-foil will continue to increase until it is discharged by a spark passing between the air-spark terminals *H I*. The discharge induces a momentary current in the insulated coil *E*, surrounding the condenser, and the effects of this discharge are very curious, as was shown by a number of experiments.

One curious thing in connection with these tertiary coil discharges, as they may be called, is that in passing through the body they produce very much less effect than the direct discharge of equal apparent strength. Thus a discharge which vividly illuminated a large Geissler tube passed through our body with but small indication of a current. The reason given by Prof. Culp for this action is that the discharge, although originated by an induction coil of alternating current, is made continuous or in the same direction through the medium of the accumulator; and taken in connection with the well-known difference in physiological effect

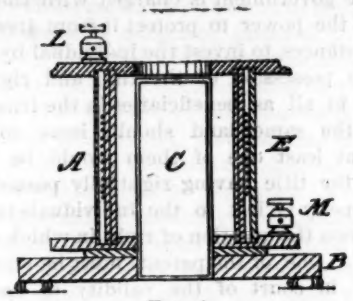



FIG. 4.

between alternating and continuous currents, the assumption is well founded. It is evident that the amount of induction upon coil *E* will depend on the capacity of the induction coil, the manner in which the condenser is constructed, and the distance apart of the points of the air-spark terminals *H* and *I*.

The phenomena are also varied by varying the construction of the shell *A*.

Prof. Culp has devised a number of other ingenious experimental apparatus which lack of space prevents us from mentioning here.

We must, however, draw attention to a few sanitary ap-

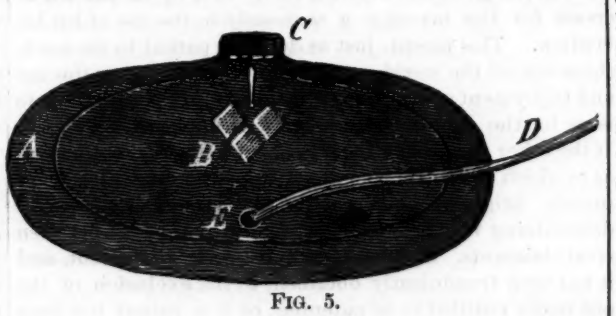



FIG. 5.

pliances invented by him, in which the generation of static electricity is accomplished in a simple manner.

Among these is the ozone apparatus, shown in Fig. 5. It consists of two discs of hard rubber, *A* and *B*. On the under surface of *B* is attached a sheet of tin-foil of the same shape as *B*, but slightly smaller. The disc *B* is connected to *A* at *C* by a brass hinge. At *E* in disc *B* is a pin, to which can be attached a rubber cord, *D*, so that by taking hold of this cord the disc *B* may be raised and lowered at will. Electricity is generated by simply separating and bringing together the two discs, and is in turn discharged, converting the oxygen of the air in the immediate vicinity into active oxygen or ozone. By arranging a series of these discs and operating them by mechanical means, such as a sewing machine or some other convenient device, a room can in a very short time be impregnated with ozone.

A modification of this apparatus can be attached to a rocker, as shown in Fig. 6, and can be used for home treatment with static electricity of many nervous disorders. We might also mention an electric gas lighter and hair-brush, shown in Figs. 7 and 8, from which vivid sparks are obtained in a similar manner, as we have had occasion to witness in this city at the office of the New York Electric Novelty Company, who have lately begun to manufacture the various apparatus mentioned above.

## Shocking a Sleeping Beauty.

The news has reached Columbus, Neb., from a farm-house several miles north that Minnie Dishner, Nebraska's sleeping beauty, recovered consciousness Sunday, Jan. 3, the seventieth day of her hystero-cataleptic trance sleep. The roads have been impassable until the present time, and news of her recovery could not be received before. The girl fell into the trance from which she has now revived Oct. 26 last.

During the long interval she has lain to all appearances a lifeless being, with the exception of respiration and pulsation. When Miss Dishner awoke her mind was apparently clear, her appetite and general feelings good, but her arms and legs were paralyzed. She says that she was conscious during the whole time of the protracted trance, but, though she exerted her utmost power to evince her consciousness, she could not move a single muscle.

She says she had no physical pain until the fortieth day

FIG. 6.

of her sleep, when an electric battery was applied. Since then she has suffered a thousand agonies of body, and at times it seemed to her as if her mind would give way under the strain, and she now complains of terrible physical sufferings in consequence of the shock to her system. The doctor in attendance says, however, that she will recover in a short time, and will also regain full use of her limbs.

## The Telephone in Massachusetts.

On motion of Mr. Lilley, in the Massachusetts Senate last week, it was

*Ordered*, That the Committee on Mercantile Affairs consider the expediency of further legislation concerning the regulation and conduct of telegraph and telephone companies doing business in the Commonwealth.

The Mercantile Committee consists of Senators Boynton, of Middlesex; Emerson, of Essex; Alger, of Middle-

FIG. 7.

sex; Representatives Fay, of Brookline; Townsend, of Lawrence; Story, of Gloucester; Brightman, of New Bedford; Hunnewell, of Wellesley; Hunt, of Boston; Millis, of Millis.

One of the bills which will be presented to the committee is to prohibit the American Bell Telephone Company from charging more than $5 royalty upon each subscriber of a sub-company, because, as the cost of the Bell's instruments is but $3.42, a royalty of $5 is nearly 150 per cent. per annum.

Another proposed bill is to limit the charges to subscribers to $3 per month. A telephone man says: "Mr. Brightman, of the Committee on Mercantile Affairs, ought to know that a $3 rate is feasible, since he is a director in a Bell sub-company which has increased its capital two or three times, and is yet paying dividends on the basis of a charge of but $3 per month to subscribers."

## Sliced Electricity.

A German explorer, one Dr. Kümmel, has discovered, it appears, an electric tree, the *Elsassia Electrica*, in New

FIG. 8.

Guinea. He proposes to chop it into slices and set up a central station for lighting by solid generators. The following description is given of the find: "I stopped under a large tree which seemed particularly to attract the attention of Kümmel, who had been finding all kinds of novelties the whole morning, to take the exact bearings of a high peak, which was visible through an opening in front of us. To my surprise, the compass seemed utterly drunk. Whilst Kümmel and I were discussing this phenomenon one of the men struck with a *machete* one of a number of peculiar buttresses, which ran up the outside of the tree, splitting off a large slice and severing a curious looking black core, which formed the centre. Kümmel placed his hands on the two ends of the core to look at it more closely (rational action), and instantly gave a yell and rolled head over heels, getting up without his spectacles, and stammering that he had had a severe electric shock (say, 150 volts!!!)." The expedition did not possess a galvanometer, but an apology for one was made with a helix of copper wire and the compass, the result

going to show that a strong current was passing through every portion of the tree. A forest of these trees was seen; the locality being nearly bare of other vegetation. The black core, we are informed, is composed of pure amorphous carbon. The story of Dr. Kümmel strongly suggests a strong favorite German beverage of the same name. Very likely the combination of these two "Kümmels" may have resulted in the production of the above fruit of the pen.

## Secretary Lamar on the Validity of the Bell Patent.

On January 14 Secretary Lamar sent to Acting Attorney-General Goode the following letter containing his conclusions upon the proofs and arguments submitted touching the validity of the Bell telephone patent of March 7, 1876:

DEPARTMENT OF THE INTERIOR,
WASHINGTON, D. C., Jan. 14, 1886.

SIR—I have under consideration the papers referred to me from the Department of Justice touching the Bell telephone patents. Desiring to be as fully advised as possible, I have called to my aid the assistant secretaries of the department and the Commissioner of Patents. In furtherance of the same desire I have invited the parties who filed their petitions with you, and also the parties interested in the patent which had been assailed, to appear before me with such proofs and arguments as they might desire to submit. A voluminous record and a prolonged and exhaustive discussion resulted. This record, embracing all the papers sent to me from your department, and also the written arguments of counsel, I transmit herewith.

The petitioners upon the ground, and for the reasons set forth in their petitions, ask the Department of Justice to cause or allow appropriate legal proceedings to be instituted in the proper court by the government, or in the name of the government, on their relation to vacate and annul the Bell telephone patent of the 7th of March, 1876. In the petitions specified, you have asked me to communicate any information on the subject to be gathered from the files of this department, and to suggest generally my views as to the action which should be taken by your department in the premises, as the Patent Office appertains to this department. I have been especially desirous to understand fully all that is alleged as ground for relief in these petitions in regard to what was done in that office, and I believe I can assure you that all the information on that subject to be gathered from the files of the office is embodied in the record herewith transmitted. I also send you the views of the Commissioner and of Assistant Secretaries Mulldrow and Jenks respectively.

In order to know what suggestions I should make as to the action of your department upon the petitions, I have heard the oral presentations of the case, and considered it again upon the proof and the able arguments of counsel as they appear in private. I thought that my own consideration should be directed to two questions, and, to meet these questions, I requested that the argument of counsel should be shaped. They are:

First—Has the government the right to institute a suit for such a purpose?

Second—If it has such right, should the proceedings invited in the respective petitions, or either of them, be instituted?

The first of these questions, specially within the cognizance of your department as it is, has the affirmative answer of numerous precedents in that department, and has received a like affirmative answer from the courts of the United States. If it had not been thus authoritatively settled, I should, on principle, have reached the same conclusion. The government is asked to institute judicial inquiry as to the patent of the Bell Telephone Company, upon the allegation that such patent was obtained, by the fraud of the patentee, with the collusion or by the inadvertence and mistake of the executive officers of the government. If these allegations be true, a great wrong to the whole people rests in the name and is sustained by the power of the United States.

To say that the government inflicts the wrong would seem to imply that somewhere among its resources the government would have the power to redress it. The argument against the prayer of the petitioners did not controvert this, but rests upon the theory that the government has provided a remedy which excludes all other modes, and, therefore, precludes further governmental actions. By a review of the patent acts of Congress it is sought to be shown that under the law of 1790, somewhat modified in 1793, the citizen was allowed to avail himself of legal objections to the patent in defense of infringement suits, and, under certain circumstances, the court was allowed to institute scire facias on inquiry into the validity of patents, and upon cause found, to vacate them. By the act of 1836, which is the only other legislation material to this inquiry, it is claimed that the patent law was changed by the establishment of a patent officer charged with the duty of investigating the claims of applicants and clothed with the power (formerly exercised by any two cabinet officers) to issue patents, and that from this law the scire facias section and so much of the defense section as allowed the court to vacate a defeated patent were omitted. Hence, it is argued that, by the act of 1836, all power to vacate a patent was surrendered, and all remedy, when a patent had wrongfully issued, was limited to a reliance upon the faults or vices of the patent in defense or actions for infringement. Without the aid of decisions made by the courts, it would seem to be apparent that the only office of these legislative changes made in 1836 was to deprive the courts of the power to vacate patents as an incident to private suits, or as a part of the judicial determination of private controversies. The power of the government to vacate patents wrongfully issued under its seal was affirmed in the very act of intrusting its exercise to the courts in private litigation. The logical inference from the revocation of that trust is not a total surrender or abnegation of the power, but the intention to keep it under immediate governmental control. The existence of the power implies the possible occasion for its exercise. The legislation which allowed the courts to exercise it defines what circumstances in that view Congress would make the occasion, and the changes made by the law of 1836 only seem to indicate that the existence of the occasion shall be brought to the notice of the proper department of the government, and the exercise of the power invoked.

Surely, if the power to vacate a patent wrongfully issued exists at all, there need not be a statute to provide a mode of its exercise when a mode exists without a statute. A patent for land may for good cause, in a proper case, be vacated at the suit of the government without a statute, and there is no difference as to the principle here involved between a patent for land and a patent for an invention. The public domain is held by the government as part of its trust. The government is charged with the duty and clothed with the power to protect it from trespass, and, under circumstances, to invest the individual by its patent with the sole possession of the title and rights before appertaining to all as beneficiaries in the trust. If two patents for the same land should issue to different individuals, at least one of them would be wrongful. In such case, the title having rightfully passed to one, it may very properly be left to the individuals to settle by private litigation the question of right in which they alone are interested. One of the patents must be void, and the establishment in court of the validity of one must of necessity first settle the character of the other. If it should come to the knowledge of the department that a patent has been fraudulently obtained, and the fraudulent patent is the only one issued for that land, then there would be an occasion which would make it the duty of the government to exercise its right to have the patent vacated, because private litigation cannot arise, and because the rights of all the people would be involved without mode of redress.

The inventor is the sole owner of his invention, but to publish it by use or otherwise, is to give it to the world. The rights which would then accrue to the whole people from such publication are confided as part of the general trust to the government, with the power, by its patent, to create for the inventor a monopoly in the use of his invention. This patent, just as does the patent to the land, shuts out all the world except the patentee from the use and enjoyment of the subject of the patent. If two patents issue for the same invention, one is certainly wrongful. If the other is rightful, the whole interest in the question as to which is rightful is confined to the two patentees, and private litigation will secure the needed remedy in determining who has the right to the patent as between rival claimants. If, however, there is only one patent, and it has been fraudulently obtained, to the exclusion of the one really entitled to be patentee, or if a patent has been issued for something not patentable, an invention already belonging to the world, it becomes the duty as well as the right of the government, when of sufficient public importance, to actively seek its cancellation, because private litigation is not a possible or adequate remedy, and because the whole people are wronged without other mode of redress.

Under our government a trust can never fail for want of a trustee, nor can fraud, mistake or accident in business transactions escape investigation for want of a tribunal while the court of equity is maintained. Representing the sovereign in his person in the mother country, that court also represents the sovereignty here in a sense and relation of nearness which no other representative can claim. All the other agents are recognized as amenable to judgment upon the strict letter of their commissions, and acting at the peril of having their action disapproved and set aside. But the court of equity, specially adapted in jurisdiction and methods to supplement statutory jurisprudence, is the depository of the reserved or not expressly delegated judicial power; especially has it the inherent jurisdiction to cancel and vacate what exists as the creation of fraud, accident or mistake, and to faithfully apply the remedy for a maladministered trust. If a patent ought to be vacated, it can always be vacated there; but the patent bears the great seal of the government, and only the government, even there, can ask to have the seal torn off.

My second inquiry was as to whether the right of the government existing, the proceedings invited by these petitions, or by either of them, ought to be instituted. The grounds of invalidity alleged against the Bell telephone patent may be substantially summarized thus:

First—The patent was procured by the fraud of the patentee through the collusion or mistake of the officers of the patent office and in violation of the rights of a caveator named Elisha Gray.

Second—The invention patented was not patentable because already public.

Referring to what I have said under the other head of inquiry, it is apparent that these allegations describe the occasions in which the government, upon my view, ought to actively interfere for the cancellation of a patent. It is manifest that a decision upon the merits of the controversy as to the validity of the patent is not embraced within the terms of your request. The issue before me lies outside of the ultimate merits of the case as a subject of judicial investigation. As to what the final judgment should be, I have not felt called upon to form, and if I had formed, I would not express, an opinion. The question is whether enough has been shown upon the hearing to require the submission of the matter to the court at the instance of the government. The proof adduced in support and defense is very voluminous and very conflicting in many respects. It involves great scientific research and detail, and, perhaps, some intricate legal questions. The allegation and the evidence touching the circumstances attending the issue of the patent are of such a nature and have such a support as to render it, in my opinion, improper to ignore or dismiss them. Such a case is presented as, I think, ought to undergo thorough judicial investigation. It appears that many suits have been pending, and many are now pending, between the corporation claiming this patent and others that assail it. In none of these cases has there been, or can there be, as I think, such thorough investigation and full adjudication as to the alleged frauds or mistakes occurring in the patent office in the issuance of the patent as could be had in a proceeding instituted and carried on by the government itself. In a case involving such questions it seems to me especially imperative upon the government, as a duty to its own officers, to vindicate or condemn, and due to the people to set on foot and follow up a complete investigation. In my opinion the proceeding should be in the name of and wholly by the government, not on the relation or for the benefit of all or any of the petitioners, but in the interest of the government and the people and wholly at the expense and under the conduct and control of the government, and I think it should be instituted at such point and in such court as will best subserve the purposes of public convenience and full inquiry. Such a proceeding so conducted will, as I think, comport with the dignity of the government and the gravity of the subject, and will insure a final and just adjudication of the merits of the controversy.

Very respectfully, L. Q. C. LAMAR.

To Hon. John Goode, Acting Attorney General, Department of Justice.

With regard to the above, the Washington correspondent of the New York *Tribune* says: The decision of Secretary Lamar, recommending the bringing of a suit to set aside the Bell telephone patent, was not unexpected by persons who have watched the case and who are familiar with the influences surrounding it. Despite the opinion expressed by Mr. Lamar, that the suit ought not to be brought on the relation of the petitioners, but in the name of all the people and on a ground different from that upon which the suit was ordered by the Department of Justice last September, everybody knows that the suit will be one for the benefit of Mr. Garland's telephone company.

Several weeks ago one of the most prominent Democrats in public life, in conversation with a *Tribune* correspondent said: "Some of the Pan-Electric telephone stock was offered to me two years ago on the same terms that Senators Garland and Harris received it. I was informed that no less than twenty Democratic Senators were holders of stock in the parent company or in some of the local companies." A representative, who was a member of the District Committee in the last Congress recently said: "A prominent Maryland Democrat came to me and offered me some of the stock of the Washington local company, and gave as one of the reasons why he was anxious that my name should be enrolled in the list of stockholders, that I was a member of the Committee on the District of Columbia, and therefore might be able to render valuable assistance to the company. I told him that he had indicated a sufficient reason for me to decline to be a stockholder, when, I suppose to overcome my scruples, he assured me that Mr. Gorman, a member of the Senate District Committee, was a stockholder. I did not embark in the scheme, however."

Senators Harris, Vance and Brown are the other Democratic members of the Senate District Committee, and Senator Harris is the Vice-President and one of the original stockholders in the Garland Telephone Company. It may be remembered that among the other directors and largest stockholders are Joseph E. Johnston, Commissioner of Railroads, and J. D. Calkins, Commissioner of Indian Affairs, both of whom are bureau officers of the Interior Department. Among the directors and officers of the "Rogers Telephone and Telegraph Company," which is "a combination of interests in the Pan-Electric and the American Postal Telegraph Companies," are General Frank Armstrong, of Texas, an Indian Inspector, and ex-Congressman Manning and Money, of Mississippi, both of whom are warm personal and political friends of Mr. Lamar, and are now living in Washington.

It is asserted by a person who has investigated the matter that Mr. Garland is not the only officer of the Depart-

ment of Justice who is interested in the Pan-Electric stock. It will be seen, therefore, that the vast speculative interests involved in the proposed litigation are in the hands mainly if not wholly of Secretary Lamar's political friends, and that if the suit succeeds they will reap very large pecuniary benefits. The effort to pass a bill through Congress to enable the Pan-Electric Company to bring a suit at the expense of the government, seems to have been abandoned. At the very beginning of the last Congress such a bill was introduced by Mr. Vance, the present Commissioner of Patents, and was referred to the committee of which he became chairman. Mr. Vance is not a lawyer, but two days after the committee was organized he brought in a substitute for the bill, accompanied by an elaborate legal argument in the form of a report. The bill passed the House only eight days afterward. When it reached the Senate, Mr. Garland, who was the legal counsel of the Pan-Electric Company, made two or more efforts to secure favorable consideration for it by the Committee on Patents, but failed. At that time he seems to have held the opinion, expressed in the report presented to the House by Mr. Vance, that "the law as it now stands, and has stood since 1836, provides no way in which a patent can be declared void except upon the ground of interference with some other patent, and then only upon the suit of some rival patentee or of some person claiming under one of the interfering patents. . . . Interfering patentees, as stated before, and individual parties when sued as infringers, alone have the means of showing that a patent was improperly granted."

Mr. E. N. Dickerson, the New York counsel of the American Bell Company, has been interviewed as to his opinion on the decision. He says:

"Of course I expected an adverse decision under the peculiar circumstances that surround this case. The only curiosity I felt was as to the grounds for such a decision. That the Secretary is all wrong is evident upon the slightest examination of the statutes. The substance of his decision is in these words:

"'If, however, there is only one patent and it has been fraudulently obtained to the exclusion of the one really entitled to be patentee, or if a patent has issued for something not patentable—an invention already belonging to the world—it becomes the duty as well as the right of the government, when of sufficient public importance, to actively seek its cancellation, because private litigation is not a possible or adequate remedy, and because the whole people are wronged without other mode of redress.'

"If it were true, as the Secretary supposes it to be, that private litigation is not a possible or adequate remedy in these cases, it would be a monstrous wrong which the courts would do their utmost to remedy. But if he had read Section 4,920 of the Revised Statutes he would have found that the two cases for which he says private litigation is not a possible or adequate remedy are in the most specific terms provided for.

"Under that section the defendant may set up:

"'Second—That he had surreptitiously or unjustly obtained the patent for that which was in fact invented by another, who was using reasonable diligence in adapting and perfecting the same; or

"'Third—That it had been patented or described in some printed publication prior to his supposed invention or discovery thereof; or

"'Fourth—That he was not the original and first inventor or discoverer of any material and substantial part of the thing patented.'

"And the statute provides that 'if any one or more of the special matters alleged shall be found for the defendant, judgment shall be rendered for him with costs.'

"The trouble with this case in Washington is that these very defenses which the Secretary supposes not to constitute a remedy in private litigation have been set up in a number of suits, elaborately tried before the Circuit Courts of the first three circuits, and have been pronounced untenable by all those courts without a dissenting voice. There is no fact before the Secretary which has not been fully set out in these defenses and decided. It is probable that more than $300,000 have been spent by infringers in the attempt to establish the truth of those propositions which Mr. Lamar thinks are not triable in private suits, and there is now on appeal before the Supreme Court every fact which was laid before him by the petitioners, and the cases will be reached next fall unless the Attorney-General will join us in asking for a hearing, which we have invited him to do. If that were done it would be a finality, and the Bell patent would be either defeated or sustained. If defeated, then none of the 600 patents issued by the patent office for trifling variations in the Bell telephone, of which the Pan-Electric owns a few, on which it has issued $20,000,000 of capital stock, would be worth one cent, because the public would be entitled to use the Bell invention, which is the best form in which the instrument exists. If, on the other hand, the Bell patent is sustained, then the injunctions would be perpetual against all these 600 infringements. It is the interest of these companies to keep the matter in doubt by prolonging litigations, during which they are enabled to manufacture and sell stock to ignorant persons at small prices, but more than it costs to print it, who suppose that the defeat of the Bell patent will establish somebody else as the inventor of the telephone, and who are caught by the distinguished names in the companies. The Secretary seems to suppose that the law would be different if the United States were a party to the suit, and that the courts would decide the Attorney-General's suit upon different principles from those governing other cases, or he would not have been led to believe that the decision of his case would be any more conclusive than the decision of the Supreme Court on the same questions in a private case.

"It is not possible to bring a case which is begun now to the Supreme Court before those on the present calendar will be reached. If in those cases the Bell patent is decided adversely to it, then it is dead, and if not the Attorney-General's suit will be as dead as if it never had been begun. The decision is a pure question of law upon facts that are of record in the Patent Office and undisputed or upon the testimony of witnesses which cannot now be altered. The Secretary advises the suit to be brought in such court as will best serve the public convenience and insure a full inquiry. It is to be presumed that he also means that the court shall have jurisdiction of the parties, and it is evident that he does not think that Memphis, Tenn., is the place that complies with any of those conditions."

Mr. Parker C. Chandler, who, with Senator Edmunds, is counsel for Daniel Drawbaugh, of Pennsylvania, in his suit claiming priority over the Bell telephone invention, in an interview in Boston on Saturday last endeavored to throw some light on Secretary Lamar's important move toward a suit by the United States to test the validity of Mr. Bell's patents. "The grounds of attack on Mr. Bell," said he, "may be divided into two divisions: First, the claim of priority of invention, which is set up by Daniel Drawbaugh, of Pennsylvania, who claims to have invented and operated a speaking telephone previous to 1876; second, the claims of numerous inventors, prominent among them Gray, Dolbear, Edison and others, that their inventions do not conflict with Bell's, *i. e.*, are distinct inventions. No telephone case has as yet reached the United States Supreme Court for final adjudication, but several are on the docket, and will be reached this year. To date the Bell patent has not had its validity passed upon by the highest legal authority, but in several of the United States circuits decrees and opinions have been rendered favorable to the Bell patent. The issues which will come before the Supreme Court at Washington in the above cases, to be argued probably this winter, are:

"Did Daniel Drawbaugh invent the telephone previous to 1876?

"Did Reis invent and exhibit the speaking telephone in Germany previous to 1876?

"Does Bell's patent for transmitting articulate sounds by an undulatory current cover all possible methods of transmitting articulate sound, or can it be transmitted by a make and break current?

"If the Supreme Court determines any of these issues affirmatively the Bell monopoly of this invention ceases to exist. The circuit courts have in no case passed upon the evidence presented by litigants on the several telephone cases, alleging that Bell's patent was obtained by fraud or mistake, or was improperly granted under the law, because it does not cover the actual invention of Bell. The question of fraud or mistake can only come into a suit authorized to be brought by the United States Government, and Secretary Lamar believes he has sufficient evidence to warrant him in ordering such a suit. A former attorney-general ordered a similar investigation of the Washburn & Moen wire patents."

## Debenture Bond Investments in Electric Lighting.

The growth in many fields of enterprise in this country during the last five or ten years has been nothing short of marvelous, and yet it is safe to say that among the industries thus remarkable for their rapid development, electric lighting ranks foremost. To those who have followed the business from its inception with observant interest, it seems but the other day that the first Gramme dynamo imported into the United States was watched with an almost reverent curiosity; or but yesterday that running several arc lamps on a circuit was hailed with wonder, and that Mr. Edison began "fooling" with that little incandescent lamp of his, of which now a quarter of a million are in use in America alone. At so great a pace has the development gone on, that it was only when Mr. Preece, the electrician of the English government telegraphs, expressed surprise to find 100,000 arc lights burning nightly all over the Union that American electricians realized the vastness and importance of what had been accomplished. While in England, for various reasons, electric lighting has made no great headway, here, as Mr. Preece took occasion to inform his countrymen, it has become one of the greatest and most promising of enterprises.

The results of the work of the last five years are, indeed, great, but when it is recognized that wherever gas or oil is used in any moderate to large quantity, there is an opportunity for the profitable introduction of the electric light, it will be seen that after all only a substantial foundation has been laid for the business of the future. What that business may be is evidenced in the statistics of the existing gas companies, now numbering about 900 in this country, with a gross capital of $300,000,000, on all of which a high rate of dividend is paid. Light for light, electricity can now be supplied just as cheaply as gas, so that, its other special recommendations being taken into account, there can be no doubt as to the greater demand for electricity at any place where a plant exists or can be put in.

It is at this point that the question arises: How shall new stations be built and new plants be installed, so that the universal desire for the electric light may be met? A great many plans have already been tried, with varying success, and now one is proposed that is an absolute novelty so far as the electric lighting industry in America is concerned. It is that of the American Electric Manufacturing Company of this city, and the care with which it has been elaborated, as well as the importance of any operations undertaken by the aggressive corporation named, renders it worthy of more than ordinary notice. The American Company is now offering for subscription, at par and accrued interest, an issue of six per cent. debenture bonds, having twenty years to run from December 1, 1885, the interest coupons being payable semi-annually, on the 1st of December and the 1st of June of each year. In adopting the system of debenture bonds, the corporation follows a practice that has been attended with great success in Europe, and particularly in England, where out of a capital of $600,000,000 invested in gas, over $250,000,000 is in bonds, which rank as the best of investments. In the case of the American Company the debenture bonds are secured by the majority interest which the company retains in its sub-companies, now paying dividends, and by the majority interest which the company will hold in all the new sub-companies of its creation. It will be observed that in reserving control of the sub-organizations, the parent company not only insures to itself the profits that arise from the manufacture and sale of apparatus, but exhibits a not unwise faith in the profitableness of the illuminating business. It will also be apparent that with the enlargement of the business comes alike a heavier demand for supplies and a lessened possibility of diminution of dividend should any one sub-company fail from lack of management or other reason. The controlling stock held by the American Electric Manufacturing Company in the sub-companies is deposited with the well-known American Loan and Trust Company, of this city, as collateral to secure the payment of the principal and interest of the bonds, it being provided that in the event of the principal and interest being in arrear the right to vote upon such stock shall be vested in the trust company. The bonds are in denominations of one hundred, five hundred and one thousand dollars and twenty, one hundred, and two hundred pounds sterling. The issue is limited to 37½ per cent. of the paid-up capital of the subsidiary companies.

Such, briefly outlined, is the plan of the company for obtaining the capital necessary to the prosecution of its work now mapped out, in the performance of which, judging from the ability and energy of the management as displayed in the past, the company ought to achieve a notable success. The arc lighting system owned by the company, constructed by it in its own fine factory, and based on the Wood patents, is highly efficient and economical, qualities due to the skill and enthusiasm with which Mr. Wood has steadily devoted himself to its perfection; and the arrangement with the Edison Company, by means of which both the arc and the incandescent light can be supplied from one central station, under the one supervision, makes the American Company very strong in the two fields of lighting. In fact, the experiment now being tried by Mr. Goff, the President of the American Company, will be watched with considerable interest. Its success will show the investing public to have been watchful of the immense advance made by electric lighting, and to be informed as to the reasonable possibilities of return on capital in it. To some of those who "started in" five or six years ago, when the newspapers were filled with wild statements as to the big profits to be made from the new illuminant, the guarantee of a modest six per cent. may seem hardly worth talking about, so small a realization is it of their hopes and dreams. To many others, however, who have carefully noted the growth of electric lighting in the face of all obstacles, it will seem good business policy thus to fix a rate that is actually exceeded in numerous cases, but which is positively sure on any sound electric lighting enterprise to-day properly conducted.

## Two Sounders in Circuit.

*To the Editor of The Electrical World:*

SIR: Will you be kind enough to inform me in the columns of your paper why two sounders, one of very low resistance, say 3 ohms, and the other of 20 ohms resistance, would not work on the same circuit?

EAST LEXINGTON, Mass. SOUNDER.

ANSWER.—The 20-ohm magnets have a greater number of convolutions than the 3 ohm. Hence, the increased effect on the core of the former with the same current.—EDS. E. W.

## Editing Poetry Sent by Cable.

We always feel an editorial anxiety about publishing poetry sent by cable. It comes without division into lines and without punctuation. If a sentence is involved, or if a word is wrong, the editor has to straighten it out somehow. We had to correct two or three words in order to

make sense, and in one case we made an error. The cable came to us:

"The woods were dead from the heat the noonday crag made the hand burn and sick from shadow not one bush was near I rose following a torrent."

How the hand could burn and be sick from shadow we do not see. And we printed it:

"The noonday crag made the land burn and sick
For shadow. Not one bush was near, I rose," etc.

But "hand" was right. It should have been:

The noonday crag made the hand burn. And, sick
For shadow—not a bush was near—I rose.

—*The Independent.*

## A Reply to Mr. Dickerson.

*To the Editor of The Electrical World:*

SIR: In answer to the statements of Mr. Dickerson that have gone the rounds of the newspapers, that Secretary Lamar's decision is not based upon the law of the country or right, perhaps one word from us may be necessary. There were two questions pending before the Department of the Interior, which were formulated by Secretary Lamar, when he requested both contestants and respondents to represent their cases to him, and they were:

First—Has the government authority to institute such a suit to vacate a patent, having once been issued by the government? and

Second—Do the facts in this case make out such a case?

As to the first proposition, the matter was thoroughly discussed before Secretary Lamar, and the precedents of the government cited fully on both sides of the question; and it seems from the investigation there made that it has been the uniform practice of the Department of Justice to order such suits upon a proper presentation of the facts to sustain them. More than 100 suits have been brought by the Department of Justice to vacate either patents for inventions or lands, and in every case, whether before a district, circuit judge, or a supreme court, the right has been maintained of the government to vacate a patent fraudulently, collusively, or mistakenly issued.

Not more than two weeks before the application was made in the telephone case to have this investigation made by the Department of Justice, Attorney-General Garland had acted in a similar case, and allowed such a suit to be brought in Boston at the request of Mr. Roberts, a brother of one of the attorneys of the Bell Co., and until within a few months a partner of his brother, and one of the attorneys of the Bell Co. It seems to make a very great difference as to the thing being right or wrong, as to whether the Bell Co. is complainant or respondent.

During the administration of the Department of Justice, Attorney-General Brewster had many such applications brought before him, and in every case he allowed the suit to be brought. Two cases became notorious; in fact, were notorious cases before they were brought there. They are known as the Torpedo, and Barbed Wire Fence cases. In the Torpedo case there had been over 1,500 decisions sustaining the patent, and there were 1,500 additional suits pending on the infringement. In the Barbed Wire case more than 3,000 decisions had been rendered against infringers, sustaining the patent, and as many more were given against infringers when the suit was brought. After a thorough investigation in these two cases, Attorney-General Brewster directed a suit to be brought, though the case was most ably defended by the most eminent counsel in the country. If the contestants in these cases did not know that the decision of Brewster was correct, and according to the law of the country, they would not have done what they did. But they, like every other lawyer who has ever studied this question, know that the government has the right to institute such a suit, because when the government directed these suits to be brought in the Barbed Wire case they immediately reduced the price of barbed wire 75 per cent. to consumers, and dropped their suits of infringement, and settled with their contestants.

In the Torpedo case the 1,500 suits pending were dropped, and nothing more was done with them. The Supreme Court has passed upon this matter again and again—one case, known as the Mowrey & Whitney case, elaborately discussed by Justice Miller; another the Throckmorton case; and another case that has just come up in California. A short time ago, Judge Shepley, in Boston, decided similarly in the Rumford Chemical Works case, viz., that such a suit must be brought in the name of the United States by the authority of the Attorney-General.

Only two winters ago Judge Wallace, of New York, affirmed the same in the Gunning case, and overruled the demurrer to the jurisdiction of the United States to vacate a patent fraudulently issued, which was again sustained by Judge Miller, and the patent was vacated and annulled. Judge Blodgett only last winter took the same view as just given by Secretary Lamar in his opinion. Of all the questions pending before the Department of Justice of such a suit to vacate such a patent, only one case has ever been refused, and that was one where the facts stated were demurrable.

The second question was, Did the facts in this case make out such a case that the authority of the government should be invoked to vacate the Bell patent? All the facts presented to the Department of Justice were new, and had never been passed upon by any court. The question of the fraud practiced in the issuance of the Bell patents has never been questioned or tried in any court before, and so also the question whether Bell is the inventor of the telephone or not. It is right here where the complainants complain against the Bell monopoly. The first suits had admitted that Bell was the inventor of the telephone, and to those admissions in the suits beginning with the Spencer case, and the Dowd case as a basis, all trouble can be traced. And in the other cases, the decisions in the first cases were followed by corut comity. They have decided a case of priority because Judge Lowell had so decided, and not because it was right, or that they had found it to be right. No matter was ever demonstrated more clearly in any court or any tribunal of justice than was done before Secretary Lamar, that Bell not only was not the inventor of the telephone, had never invented a speaking device, had never thought of a speaking telephone, and that his device will not speak, will not act as a telephone; but the further fact, that the telephone had been invented, used and sold and published years before Bell filed his application for multiple telegraphy in Feb., 1876, never could be more thoroughly demonstrated than it was before Secretary Lamar, and also that Reis invented a speaking telephone in 1860 and 1864, and that the transmitter to-day in use by the Bell Company is simply an improved Reis transmitter, and the improvement is simply the use of the carbon points of contact instead of the platinum points as Reis used it. Never perhaps was an invention more clearly demonstrated and proved than that Antonio Meucci, of Staten Island, had a speaking telephone in his house from 1856 to 1872, and that his invention embraced almost every improvement that has been added to the telephone from that day to this. Mr. Meucci not only invented the telephone, but he published it, and used every means in his power to introduce it into public use. For two years, the testimony shows, he was in consultation with Mr. Grant, Vice-President of the District Telegraph Company, of New York, praying that he would suffer him to put his telephones upon the telegraph wire and demonstrate their utility. Mr. Meucci caveated his invention, and Major Wilbur, in his statement before Secretary Lamar, said that, had Mr. Meucci been able to renew his caveat once more, neither Bell nor any other improver of the telephone could have obtained a patent as against Meucci's invention. And what is peculiar about the matter is that Mr. Meucci was unable to renew his caveat in 1875. But the fact that he was unable to renew his caveat from poverty is equivalent to its renewal, and consequently his caveat did not cease. THE GLOBE TELEPHONE CO.

NEW YORK, Jan. 18, 1886.

## New York Telephone Rates.

At a recent meeting of the New York Board of Trade and Transportation, the question of excessive charges for telephone service was discussed, and a resolution was adopted requesting the State Senate to appoint a committee of three Senators, with power to employ counsel, a stenographer, and, if necessary, an accountant, to investigate all the relations to the public of telephone companies doing business in the city of New York, and also how their charges, capital, earnings, dividends and service compare with those of other cities. The said committee is desired to report as early as possible during the present session by bill or otherwise, what, if any, legislation is needed to protect the public interest.

Last week, in the New York State Senate, Mr. Reilly introduced the following resolution prefacing it with a statement that it was introduced at the request of the New York Board of Trade and Transportation:

*Whereas*, The charge for telephone service in the city of New York has been raised since the consolidation of the various companies from $5 to $12.50 per month, which is greatly in excess of the charges in other cities, and the excuse given for this is the alleged greater expense per subscriber attending the service where a large number of subscribers exists, and it is claimed that the telephone companies are not making excessive profits upon the actual capital invested, and it should be authoritatively ascertained whether or not this be true, so that if true the public may be satisfied, and if not true that a combination of companies using the public streets and doing business by virtue of a public franchise should not be allowed to use those privileges to unduly tax the public;

*Resolved*, That a committee of three Senators be appointed to investigate all the relations of the public to telephone companies in New York, and as to how their charges, capital, earnings, dividends and service compare with those of other cities, and report if any legislation is necessary to protect the public interest.

On motion of Mr. Fassett the resolution was tabled.

## A Concession to the New England Telephone Company.

The directors of the New England Telephone and Telegraph Company held a special meeting in Boston on Jan. 13, when a long report, which is given below, was submitted by the committee appointed last October to consider the matter of a dividend. They recommended that a dividend of 75 cents a share be declared. The chair was occupied by the president, General Sherwin, and all but two of the directors were present. The report of the committee was as follows:

For the past two years it has seemed wise to your directors to use the net earnings of your company in payment of its debts, and in providing for necessary construction, as under the contract with the American Bell Telephone Company, the stock representing plant is obliged to furnish all money needed for construction without calling on the so-called license stock to contribute. If this were to continue in the future as in the past, stockholders could expect but small dividends, and those varying in amount as the needs of new work from year to year left more or less net earnings for division among the stockholders. Under these circumstances, the directors, having before them the desire of the stockholders for a return upon their investment, saw that as a preliminary step a method must be devised for providing for construction in some other way than from rights secured to it by the contract, since, in addition to its not being obliged, as an owner of license stock, to contribute to the construction funds, it had a large amount of license stock, which each year became entitled to participate in dividends. At the October meeting of the directors, therefore, a committee was appointed, consisting of Messrs. H. S. Hyde, Fred. Ayer and Stephen Salisbury, to confer with the American Bell Company and to devise some plan by which dividends could be resumed. The committee has held several meetings with the officers of the American Bell Company, and has been met by them in a friendly spirit. The result of the meetings has been that the American Bell Company has assented to the plan proposed by your committee, and has agreed to join with the other stockholders in consenting to the issue of a seven per cent. preferred stock, to be issued as needed for construction purposes, but not to exceed $1,000,000 in any event; and has further consented to a modification of its contract with the New England Telephone and Telegraph Company, so that, in the place of the present arrangement, by which its license stock becomes participating from time to time, it will for a term of years return all dividends on nearly three-fourths of its license stock until a block of stock aggregating $7,000,000, and including all the so-called purchase stock, and with about one-fourth of the license stock, shall have received three and one-half per cent. per annum. It is not expected that preferred stock will be needed for the ordinary purposes of construction to a larger amount than $100,000 per annum, but the limit was made $1,000,000, to provide for all contingencies. The details of the plan are as follows:

Make a preferred stock not to exceed $1,000,000, and bearing seven per cent. dividends and sharing equally in all dividends after the other stock has received seven per cent., such preferred stock to be issued as needed for construction or purchase of plant and to be offered to the stockholders pro rata.

Make up a block of stock as follows:

| | |
|---|---|
| Stock issued for property other than license | $5,895,600 |
| License stock | 1,104,400 |
| Total | $7,000,000 |

The American Bell Telephone Company agrees to waive until Jan. 1, 1893, to the New England Telephone and Telegraph Company all dividends on the balance of its license stock from the earnings of each year, until the above mentioned block of stock shall have received 3½ per cent. dividends, to be declared quarterly, and for the first year in the manner following: Three-fourths of one per cent. for each of the first three quarters of the year, and the balance of the net earnings (up to a total of 3½ per cent. for the year) for the dividend for the fourth quarter. But these dividends are not to be cumulative from year to year.

All net earnings, after paying 7 per cent. dividends on the preferred stock, and 3½ per cent. dividend on the block of $7,000,000, to go to the balance of the American Bell Telephone Company's license stock, until said balance has received 3½ per cent., but this dividend shall not be cumulative from year to year; and after 3½ per cent. has been paid as aforesaid, all stock other than the preferred stock to share equally in dividends, until it has received a total of 7 per cent. In all dividends over 7 per cent. all stock shall share equally.

The waiver of dividends involved in the above plan on the part of the American Bell Telephone Company to take the place of the waiver of dividends in the existing contract.

A meeting of the stockholders to be called at once to vote on the issue of preferred stock and on the change in the terms of the contract. At this meeting the American Bell Company will vote in favor of the plan, only in case a majority of the stockholders present in person or by proxy, other than the American Bell Company, by an informal vote, signify their consent to the plan.

The report was accepted without discussion, and it was voted to recommend its adoption by the stockholders. It was recommended by the committee that a dividend of three-quarters of one per cent. on the block of $7,000,000 be declared payable Feb. 15 to holders of record Jan. 30, 1886, and the recommendation was adopted. It was voted that stock-books be open from Jan. 30, at 5 P. M., until Feb. 12, 1886, at 9 A. M. A meeting of stockholders was called for Feb. 2, at 11 A. M., in New York City, to act upon the matter.

## NEW YORK NOTES.

OFFICE OF THE ELECTRICAL WORLD,
Jan. 18, 1886.

The illustrated catalogue, just issued, of the Stout-Meadowcroft Company, of this city, is a handsomely printed work, and is a comprehensive index for all general electrical supplies. The lamps of Mr. Edison are illustrated in great variety, and several other of his inventions. I also note a full line of batteries, wire-testing and other instruments, electro-medical apparatus and accessories.

Last week the city of Hoboken, N. J., was lighted electrically by the Thomson-Houston system. W. T. H.

## NEW ENGLAND NOTES.

BRANCH OFFICE OF THE ELECTRICAL WORLD,
BOSTON, Jan. 18, 1886.

The Electrical Development and Manufacturing Company, of this city, report that they are pushed to the utmost limit of their manufacturing facilities in filling orders for their new call-boxes and the Davis "cut-out."

The Boston Electric Company has moved into larger and more elegantly fitted offices adjoining its former quarters, the present number being 548 Washington street. The company has now the entire upper portion of both the

large buildings, Nos. 548 and 550, which more than doubles the space heretofore occupied; consequently, its facilities for manufacturing are increased, which will greatly enhance the prompt filling of orders for the numerous kinds of electrical goods which the above-named company manufactures.

The Chemical Electric Light and Power Company, whose executive offices are at 95 Milk street, reports a very satisfactory demand for the Volta Pavia primary battery.

The factory of the company in Charlestown street is now fully and completely equipped with machinery for turning out all the apparatus needed in placing the Volta Pavia in proper shape before the public.

The working force of the company are busily engaged getting out one thousand of these batteries.

The articles of agreement of organization of the Meigs Elevated Railway Construction Company have been filed in the office of the secretary of state. The company, according to the document, is organized to carry on a mechanical business of construction of elevated railroads, rolling stock and equipment, and is located in Boston, with 1,000 shares of $100 each. The document, dated Jan. 8, 1886, is signed by Benjamin F. Butler, president; William S. Butler, treasurer, and A. C. Drinkwater as a majority of the directors. Other names appended to it are: W. W. Kimball, Irving A. Evans, John P. Squire & Co., L. C. Hurd, Rosswell C. Downer, Henry L. Millis, Fred F. Squire, W. P. Lane, Frank O. Squire, Walter L. Hill and R. B. Brigham.

The sixth annual ball of the Boston & Maine Railroad telegraph operators took place last Friday night in Monument Hall, this city. Mr. H. M. Cross was floor director, with the following gentlemen as his assistants: E. A. Nutting, C. W. Green, G. W. Staples, A. G. Lunt, Wm. Hogan, G. M. Fossett, S. A. D. Forristall, W. Thompson, J. A. Prescott, J. H. McDonald and E. E. Nowell. The affair was largely attended, and everything passed off pleasantly and satisfactorily.

The Shafer Electric Manufacturing Company, with offices corner of Osborne and Main streets, Cambridge, Mass., are spreading broadcast the most remarkable claims as to the wonderful processes of the company; which, it is alleged, enables the production of 5,000 incandescent lamps at the same cost as 50 are produced by any other manufacturer.

The Schuyler Electric Light Company, of Hartford, are soon to introduce their system of arc lighting in the village of North Attleboro, Mass. Messrs. H. M. Daggett, Jr., and George A. Hancock are really the promoters of the enterprise, and they have contracted with the above company to have the installation of the plant—which will be of 100 lights—begun at once.

Report comes from Lowell, Mass., that the concessions of the American Bell Telephone Company to the New England Telephone Company's stockholders are not regarded with much favor in that city. A prominent telephone man recently remarked that the whole plan was drawn up in the interest of the American Bell Company, and was rushed through before the Lowell directors of the New England Company had time to comprehend thoroughly that the New England Company's stockholders would be placing an additional mortgage on their property if they accepted the proposition.

Report comes from Wallingford, Conn., that, owing to a quarrel between the gas company and the councilmen, the streets of that town have been in total darkness, the gas having been shut off. Here is an opportunity that should be immediately embraced by one of our electric light corporations.

Electric signals have just been placed at all the railroad crossings in the vicinity of Woburn, Mass.

The Redding Electrical Company, with factory and offices situated at No. 30 Hanover street, this city, speaks very encouragingly of its general business. Mr. Jerome Redding, the treasurer and general manager, states that business is especially good in the line of popular electric striking gongs and electric watchman's time registers. Of the latter instrument in particular the Redding Company is putting out a great number, not only among dealers in electrical goods, but filling orders direct with many manufactories and large business houses. The company has in stock a large number of hotel and house annunciators, which they advertise to sell at prices never before offered, in fact at cost. W. I. B.

## PHILADELPHIA NOTES.

BRANCH OFFICE OF THE ELECTRICAL WORLD,
PHILADELPHIA, Jan. 18, 1886.

The "stock ticker war" has ended for the present. The Western Union, through the Philadelphia Local Company, served notice upon the "bucket shops" that it would remove its "tickers" from their rooms. Thereupon John G. Sterrett and four other firms brought suit to prevent this action, and on Saturday last the Common Pleas Court granted preliminary five-day injuntions, upon the unopposed application of counsel representing the plaintiffs. These injunctions will restrain the defendant company from removing their stock "tickers" from the plaintiff's offices until the right to do so is determined by the Court after argument.

After receiving notice from his counsel of the action taken by the Court, President Bentley, of the Philadelphia Local, stated that, under the circumstances, the company would be compelled to postpone the removal of the instruments until the case had reached a judicial determination. He was satisfied with the course which the dispute had taken, as now the standing of the establishments known as bucket shops could be ascertained in a legal manner, and many doubts removed concerning their character and business.

The latest communication of President Green, of the Western Union to our City Councils, *in re* the underground excitement, has an element of fairness about it that cannot be ignored even by a stupid politician. "We have never thought it safe," says Dr. Green, "to rely solely on underground wires until they had worked successfully for twelve months. But we shall be governed in that, in a good measure, by the judgment of your own City Superintendent of Electric Wires"—that is to say, the city itself shall be judge of the feasibility of underground working. To guard against interruption of communication through accident to the cables, Dr. Green requests that, even after the underground system shall be complete, the overhead wires be allowed to stand during the period of the test. Then follows his proposal. His company, he says, is "willing that the city shall place in our ditch, in form of cable or in separate tube, the city wires for their telephone, police and fire-alarm service, not exceeding twenty wires, in order that the city may fully test their success, and will remove the overhead wires as soon as the success of the underground working is sufficiently established to render it safe to the public service to dispense with them." There could be no fairer test than that.

At Harrisburg, on Saturday, Judge Simonton decided an important case in favor of the Western Union. Some days since, in a suit pending against that corporation, the Attorney General asked for letters rogatory which were granted to the Supreme Court of New York, the object being to take the testimony of witnesses in that State *viva voce*. Subsequently counsel for the telegraph company moved to have the letters rogatory revoked upon the ground that testimony of witnesses in other States could be properly taken only by commission. Judge Simonton heard argument upon this question and handed down an order sustaining the position of the company's counsel and revoking the letters rogatory. The case involves about $25,000 claimed to be due the State as tax on receipts from messages sent into, out of or through the State, which tax the company claims to be unconstitutional. E. F. I.

## THE TELEGRAPH.

**Smaller Cable Profits.**—The Direct Cable Company's report shows that the receipts have decreased $150,000 during the past six months, and attributes the decrease to the reduction in the tariff and to competition.

**A One-Horse Company Sold.**—The lines, etc., of the Pensacola Telegraph Company have been sold at Pensacola, Fla., by the sheriff and purchased by the Western Union Telegraph Company for $1,299.60—no other bidders. The property is said to be worth much more.

**T. M. A. L. A.**—Two weeks ago a few telegraph operators of Boston met at Young's Hotel and organized the Telegraphers' Mutual Aid and Literary Association. The association has now a membership of over 100 of the best men in the business, with Eugene J. O'Connor, B. C. Chase, George H. Winston, M. C. Harrington, M. W. McLean, and J. J. O'Leary as officers. The association proposes to give a ball at Odd Fellows' Hall on Friday, Feb. 19. The proceeds will be put into the treasury for the benefit of sick and disabled members.

**Stay of Proceedings by Telegraph.**—Milton Weston, a Chicago capitalist, recently convicted of manslaughter in the Murraysville gas well riot case and sentenced to five years in the penitentiary, appeared in court at Pittsburgh on Jan. 13 to relieve his bondsmen. He presented telegrams signed by Supreme Court Prothonotary Green of the Eastern District stating that a ten days' stay of proceedings had been granted. Similar dispatches were received by the Sheriff of Allegheny County. The court refused to recognize the telegrams, but deferred action until officially notified by the Supreme Court.

**Suing on a Telegraph Mortgage.**—The suit of the Farmers' Loan and Trust Company for the foreclosure of a mortgage of $300,000 on the lines of the Bankers and Merchants' Telegraph Company between this city and Washington is on trial before Judge Lawrence, in Supreme Court, Special Term. Ex-Senator Conkling and Edward Lauterbach moved for the dismissal of the complaint on various technical grounds. The motion was denied and then they began to present evidence to show that the United Lines Telegraph Company acquired the property of the Bankers and Merchants' Company under a sale at which it was announced that the property would be sold subject to the incumbrance of the divisional mortgage.

**Society of Telegraph Engineers.**—At the last meeting of the English Society of Telegraph Engineers and Electricians, the new president and council were balloted for on a new system, which consisted in submitting double the number of candidates required for election, and leaving the members to choose the names for themselves. The result of the ballot showed that Professor Hughes had been elected President, and that the new members of Council were Professor Fleming, Professor Perry and Professor Silvanus Thompson, while the new associate members of Council were Mr. Lant Carpenter, Mr. Gisbert Kapp, and Mr. John Munro. The next meeting of this society will be held Jan. 28, when Mr. Spagnoletti will resign the presidential chair in favor of Professor Hughes.

**Troubles of the Postal.**—A decree for the sale of the Postal Telegraph Company's property was entered by Judge Blodgett at Chicago on the 15th inst. The property comprises all of its lines in Illinois, the lease of tubes from the Chicago Conduit Company and its offices. In the United States Circuit Court, June 1, 1885, Eugene Howell recovered a judgment against the company for $61,266. The company filed a bill to enjoin sale under his judgment and Albert B. Chandler and Henry Rosener were appointed Receivers, the sale being enjoined. Howell filed a cross bill, claiming the right to sell to satisfy his execution. The Court found that Howell was entitled to a satisfaction of his execution, and if it is not paid in ten days the whole of the company's property is to be sold after four weeks' notice.

**Earnings of the United Press.**—The annual meeting of the shareholders in the United Press was held last week at the St. James Hotel. The directors' report showed that the business of the association had been largely increased during the past year, the earnings having reached the sum of a quarter of a million dollars. The treasurer's report showed a handsome surplus on hand to the credit of the shareholders. The following named officers were elected for the coming year: President, Charles H. Taylor, Boston *Globe;* Vice-President, John H. Farrell, Albany *Press and Knickerbocker;* Treasurer, C. R. Baldwin, Waterbury *American;* Secretary, Walter P. Phillips. The Board of Directors is composed as follows: Charles H. Taylor, John H. Farrell, C. R. Baldwin, Walter P. Phillips, James W. Scott, William L. Brown, Robert S. Davis, W. C. Bryant, James E. Scripps, Arthur Jenkins, E. H. Butler, Samuel D. Lee, and Samuel S. Blood.

**Reopening Telegraph Litigation.**—On petition of Millard R. Powers, trustee of 940 bonds of the Bankers & Merchants' Telegraph Company, Presiding Judge Noah Davis, of the Supreme Court, has granted an order directing the Reorganization Committee of that company and others interested to show cause why the sale of the company's property to Edward S. Stokes for $500,000 should not be set aside because the price was inadequate; why the property should not be taken out of the hands of the United Lines Telegraph Company and put once more into the custody of a receiver, and why it should not be relieved of the lien of mortgages for $4,800,000 put upon it by the United Lines Company, and of which mortgages the Farmers' Loan & Trust Company is trustee. Mr. Powers asserts that the court was induced to order the sale of the property last July by the representation that it was being burdened with incumbrances in the hands of receivers; that it would bring at sale $1,000,000, or double what it did bring, and that if any part of the purchase price was paid in receivers' certificates, a bond would be given to secure the interests of recalcitrant bondholders, which bond has never been given.

## THE TELEPHONE.

**A Lighthouse Telephone.**—A private telephone line will be established between Portland, Me., and the two lights, which will be of great service in procuring assistance from the city in case of wreck.

**Telephonic Devotions.**—Princess Victoria, of Sweden, has had her private apartments put in telephonic communication with the chapel of the royal palace, as the state of her health no longer permits her to assist in person at the celebration of the divine offices.

**A Decline and Rally.**—In the Boston Stock Board on Jan. 15, the telephone stocks, as was to be expected, declined, owing to the decision at Washington. The result of the Washington movement will not, in the opinion of the Bell people, have much, if any, influence upon the financial operations of the company. Yet the decision sent the Bell stock from 172 down to 161, with 160 bid, and even 150 talked of. The sales were not heavy, being in all only 300 shares. A rally occurred about noon, when sales were made at 163. New England Telephone stock declined from 36⅞ to 34, but afterward rallied to 35. Erie settled back from 31 to 29¾.

**The Validity Suit.**—The suit by the government to test the validity of the Bell telephone patent will probably be brought in the District of Columbia. Assistant Attorney-General Goode has not yet sent word to the Secretary of the Interior that the suit will be brought there, but the general opinion among the lawyers is that it cannot be brought in Memphis, as that is not the domicile of the Bell Company. There have been intimations that the Bell Company do not desire to have it brought in Boston, and to the government it will be now convenient to try the suit at Washington. Professor Bell, of the Bell patent, says he is well suited with Mr. Lamar's decision, and expresses great confidence in the ability to establish the validity of his patent in the courts. The case will have the best legal talent in the country.

## THE ELECTRIC LIGHT.

**A Temporary Set Back.**—Two Western railways have discontinued the use of the electric headlight on their engines. The trial proved satisfactory, but the cost, about $400 per engine, was considered too great for these days of small earnings. One fault found with these headlights was that the reflection was so brilliant that pale signal lights were eclipsed.

**The Household Electric Light Manufacturing Company** was incorporated in this city on Monday last. The object of the company is to operate the Kookege inventions for the lighting of houses by primary batteries. The system has been in operation in a number of places for some time past. Zinc and carbon are the electrodes employed, the composition of the solution being kept secret. At present, renewal is required about twice a month. We learn that plants are now being arranged for J. Pierrepont Morgan, Whitelaw Reid, Lanier & Kemp, and others. The incorporators of the company are Thomas Wallace and Messrs. Kookege and Meadowcroft.

**Brush Multiple-Series System.**—This system, introduced at Geneva, N. Y., by the Brush-Swan Electric Light Company there, Chas. H. Avery, Superintendent, has now been in successful operation since July. Two sizes of lamps are used—16 and 30 candle-power. These lamps emit a steady, mellow light, and excite general admiration. A single group of seven 16 c. p. lamps is found to be adequate for lighting an average store, and the users are greatly pleased. The Geneva *Courier* praises the system very highly for its steadiness and efficiency. Mr. Avery runs his plant with a Ball engine, which he considers "the best for electric lighting purposes on the market."

## PERSONALS.

**Mr. Joseph P. Davis,** long and favorably known a vice-president of the Metropolitan Telephone Company of this city, has resigned that office and has been succeeded by Gen. H. S. Huidekoper, lately postmaster of Philadelphia, and said to be a man of considerable executive capacity.

**Jay Gould's Travels.**—Jay Gould had planned to steam as far into the tropics as Rio Janeiro, but his notion is now said to be to turn the Atalanta's prow toward the Western shores of the Caribbean Sea. Should he linger long enough thereabouts he may meet M. de Lesseps, who is to leave Havre for Panama on the 28th inst.

**Mr. Harry M. Byllesby,** formerly a contractor for the Edison Electric Light Company, has recently been appointed Eastern manager of the Westinghouse Electric Company of Pittsburgh. He has already succeeded in sending to the parent company orders amounting to over $40,000 for incandescent lighting contracts alone, and is filling orders at the Windsor Hotel, this city; the Broad street depot, Philadelphia; Roselle and Trenton, N. J., and is furnishing other electric light companies with incandescent lamps. He has probably had as much experience in putting up electric light plants as any other engineer in the country. He is said now to be actively forming a sub-company for work in an adjacent State.

**M. Lammi.**—One of the attorneys who is engaged in contesting the Bell telephone patents is a character. He is the Italian attorney of Meucci, the inventor, who lives in the old Garibaldi cottage on Staten Island. His name is M. Lammi. He mingles law with the importation of Italian produce, for the sale of which he has a place on Liberty street. A short and pudgy man, with silken black whiskers, he has a smiling countenance. He was with Garibaldi in all the military movements by which that patriot insured the liberty of Italy, and bears nineteen

wounds. The most serious of these was caused by a bullet which struck him in the breast and followed a rib around his body, coming out at the back. He had also a serious wound in the right wrist by which his arm was made useless for two years. He regained power over it through gymnastic exercises and horseback riding. Although Mr. Lammi is as mild a mannered man as the famous old time rover of the seas, it is said that he has fought no less than five duels.

**Francis Lee Higginson**, of the firm of Lee, Higginson & Co., is, says the Boston *Herald*, a man of medium height and fine physique. His hair and mustache are blonde. He dresses well, though not at all conspicuously. Mr. Higginson is a graduate of the Harvard class of 1863. He became a member of the Somerset Club in 1871, and of the Eastern Yacht Club in 1880. He also belongs to the St. Botolph. He married a Miss Borland, daughter of J. Nelson Borland, the eminent physican, who was at one time president of the Somerset Club. "Frank" Higginson, as his friends call him, began his career 20 years ago with the firm of Lee, Higginson & Co., which came into existence about that time. It is said that he has done more than any member of that widely known house to develop the business which it has subsequently acquired. It was he who had most to do, in company with Nat Thayer, with engineering the consolidation of the Boston, Clinton & Fitchburg Railroad with the Old Colony. It was he who threw the firm into the great Bell telephone speculation, by which it cleared something like $1,500,000. It is supposed that Lee, Higginson & Co. control a very large portion, if not the majority, of Bell telephone stock to-day.

## MISCELLANEOUS NOTES.

**A Conduit Company.**—The certificate of incorporation of the Continental Conduit Company was filed in the County Clerk's office, New York City, on Jan. 18. The company is "to manufacture conduits for telegraph, telephone, electric light, and other electric conductors, separately, or in combination with sewer, water, gas, steam, and other service." Its capital stock is $2,000,000, and its incorporators and trustees are John D. Beere, J. Pierson Grant, Eugene W. Austin, Charles D. Judd, and Edward B. Thomas.

**A Year's Copper Product.**—The copper product of the Lake Superior mines for 1885 foots up as follows: Calumet & Hecla, 29,071 tons; Quincy, 3,921; Atlantic, 2,456; Franklin, 2,406; Huron, 1,379; Allouez, for seven months, 979; Copper Falls, eight months, 520; total, 40,988 tons. Smaller mines in Keweenaw and Ontonagon counties will add about 6,000 tons to the above total. The increase of the Calumet & Hecla product over 1884 was 4,074 tons; the Huron, 186; Atlantic, 257; Quincy, 475.

**Electrical Treatment for Poisoning.**—At Malone, N. Y., on Jan. 13, about 4 P. M., John S. Gillett, aged 32 years, entered a drug store, and going to the back room, swallowed the contents of a sixty-grain bottle of morphine. At 8 o'clock he was pronounced dead, but later signs of life were discovered. Vigorous manipulations were resorted to and a galvanic battery was applied to his body, and at 5 o'clock next morning he gave signs of returning consciousness, and recovery was thought probable.

**Favoring the Dorsett Conduit.**—A very able report has been presented to the Minneapolis City Council by a special committee, of which Mr. Geo. W. Cooley was chairman, favoring the Dorsett system for putting the wires underground. A meeting of the Committee on Fire Department and the Committee on Ordinances will be held on January 28, at 10 A. M., for the purpose of consulting with telephone, telegraph and electric light companies, or the representatives of cable and conduit systems, in regard to placing the wires underground.

**The Bentley-Knight Company** entered into arrangements last summer with the Rhode Island Locomotive Works, at Providence, to furnish cars and motors of their design, and this work is rapidly being pushed to completion. A section of track 550 feet in length has been built in the locomotive works, with grades, etc., as they would have to be surmounted in actual practice, and upon this the working of the system will be exemplified on an extensive scale as soon as the necessary preparations can be completed. When this is accomplished, the attention of the company will be directed to filling several contracts which they now have on hand. Among these are railways for Washington and several other large cities, notably Boston, where a track will be laid on Huntington avenue for the Metropolitan Horse Railroad of that city.

## SPARKS AND FLASHES.

**Chestnut.**—A telegraph man says that the first message sent through a new cable or completed land line is invariably the prosaic phrase: "Do you get me now?"—*Philadelphia Press.*

**The Telephone in Civil Service Reform.**—An English company proposes to put telephones in hospital wards to enable patients afflicted with contagious diseases to talk with friends without communicating infection. Suppose this plan should be tried on the hungry and thirsty Democratic office-seekers. Suppose also, the White House be made the central office. What a hullaballoo there would be!—*N. Y. Tribune.*

**Edison or Venus?**—The people of Elizabeth, N. J., just now have apparently lost interest in the city debt, and devote their time to star-gazing. About half the population are on the streets at night gazing eagerly toward the south and trying to decide the disputed point as to whether it is the planet Venus they really see twinkling in the sky or Edison's electric light at Menlo Park. The advocates of the latter theory are very numerous.

**Trying to Get Acclimated.**—Before he got ready to go on board the Atalanta for his Southern trip, Jay Gould dropped into the habit of spending an hour or two every evening in the Windsor Hotel baths. One night, a fortnight or so ago, the weazened gentleman paraded into the corridors of the Windsor, where a throng of Wall street men were sacrificing time after their usual nightly fashion. Two or three men returned his salutation; nobody tried to approach him; nobody wanted to be seen in public hobnobbing with him—at least nobody of consequence did. One young gentleman, with a keen scent for glory, did venture to put in a word or two with the "little man," and then had the temerity to stalk into a knot of Stock Exchange operators, ready to impart the important news he had heard from his oracle. "Mr. Gould," he began, "is going through a course of training preparatory to his yacht voyage, and he takes a sulphur bath now every night." "Sulphur baths!" ejaculated Editor Charlie Keep, of the *Wall Street News.* "Why don't he wait? One of these days he'll get a plenty of that sort of thing for nothing." "He is trying to get acclimated," said another irreverent man.

## STOCK QUOTATIONS.

Telegraph, telephone and electric light quotations on the New York Stock Exchange, Boston Exchange and elsewhere are as follows:

**Telegraph.**—Am. Dist., a 31; B. & M., b 2, a 3; Western Union, b 71, a 71¼.

**Telephone.**—Am. Bell, b 158, a 160; Erie, a 30; New England, b 34, a 35.

**Electric Light.**—No new quotations.

## BUSINESS NOTICES.

**Business Brisk.**—The Jewell Belting Company, Hartford, reports an improvement in its business, and is increasing its working force to some extent.

**The Fitchburg Engine.**—The following parties are now using the engine of the Fitchburg Steam Engine Company for electric light plants: Consolidated Electric Light Co., Portland, Maine, two engines, 75 horse-power each; Salem Electric Light Co., Salem, Mass., one 75 horse-power engine; Wachusett Electric Light Co., Fitchburg, Mass., two 75 horse-power engines; New Britain Electric Light Co., New Britain, Conn., 50 horse-power; Middletown Electric Light Co., Middletown, Conn., 75 horse-power engine; Oneco Manufacturing Co., New London, Conn., two 60 horse-powe. engines; Bates, Reed & Cooley, Broadway, New York, one 40 horse-power engine (private plant); Dunham, Buckley & Co., Broadway, New York, one 40 horse-power engine; Grinnell Manufacturing Co., New Bedford, Mass., one 150 horse-power engine, incandescent for mill; St. Louis Electric Illuminating Co., St. Louis, Mo., one 60 horse-power engine; Knoxville Electric Light Co., Knoxville, Tenn., 85 horse-power; Marlboro Electric Light Co., Marlboro, Mass., 50 horse-power; Freeland, Loomis & Co., Washington street, Boston, plant for store.

**Pike's Toothache Drops.**
Cure in 1 minute; harmless, quick, thorough; no equal; 25c.
DEAN'S RHEUMATIC PILLS are a prompt, sure cure; 50c.
HALE'S HONEY, the great cough cure, 25c., 50c. and $1.
GLENN'S SULPHUR SOAP heals and beautifies the skin; 25c.
GERMAN CORN REMOVER kills corns and bunions; 25c.
HILL'S HAIR AND WHISKER DYE, black and brown; 50c.

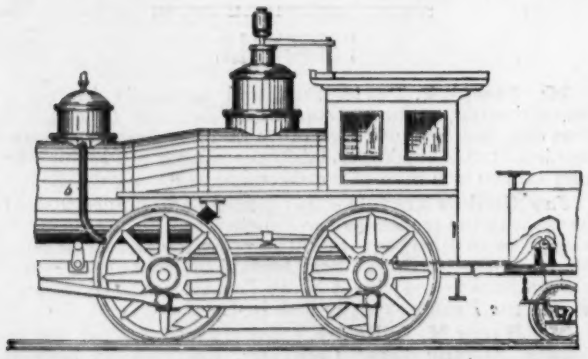
# OUR ILLUSTRATED RECORD OF ELECTRICAL PATENTS.

### PATENTS DATED JANUARY 5, 1886.

**333,554. Magnetic Friction Device for Locomotives**; Nathaniel S. Shaler, Cambridge, Assignor to Theodore A. Dodge, trustee, Brookline, Mass. Magnetic iron ore is fed through the pipe, and while the driving wheels are magnetized.

**333,563. Dynamo Armature**; William Stanley, Jr., and Oliver B. Shallenberger, Pittsburgh, Pa. As shown in the cut, consists of alternate layers of wire, one wire being rectilinear and the other coiled liked the ordinary cylindrical coil spring.

**333,564. System of Electric Lighting**; William Stanley, Jr., Pittsburgh, Pa. Each cross circuit consists of two auxiliary wires besides the wire forming the lamp-circuit proper, which may be called the "series wire." The two auxiliary wires are connected at intervals by cross-circuits, one for each lamp. One of the auxiliary



333,554. MAGNETIC FRICTION DEVICE FOR LOCOMOTIVES.

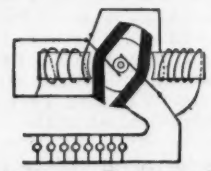
wires is connected to one of the main conductors, and to the other auxiliary wire is connected the wire forming the lamp-circuit proper, which is also connected to the other main conductor. Thus each cross-circuit between the mains is composed of two sections, which are in turn connected by cross-circuits.

**333,573. Dynamo**; Elihu Thompson, Lynn, Mass. He claims (the disposition of circuits being shown in the cut) field magnet cores wound with wire connected in derived circuit or shunt to the work, and an armature surrounded by stationary coils traversed by the main current of the machine.

**333,614. Electric Bell**; Constant F. de Redon, Paris, France, Assignor to Jean F. Moreau, of same place. Consists in providing a stop or retractor on the armature, against which the contact-spring shall press, and which draws the spring away from the fixed contact in case its own elasticity would otherwise cause it to remain in contact therewith.

**333,665. Railway Switch Alarm**; Abiel Pevey, Lowell, Mass. Consists of a slight, but valuable modification of the well-known indicator for informing an engineer of a misplaced switch.

**333,698. Circuit Regulator**; William M. Thomas, Grand Rapids, Mich., Assignor of one-half to the G. R. E. L.



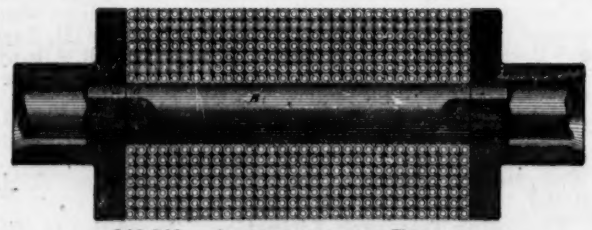
333,573. DYNAMO ELECTRIC MACHINE.

and P. Co., of same place. The regulator consists of an ordinary arc-lamp, having a lower resistance than the other lamps.

**333,739. Electro-Medical Battery**; Samuel France, Bourbon, Ind. Consists of minor details of construction.

**333,779. Electrical Meter**; William C. Patterson, Elizabeth, N. J. The action of a ray of light upon prepared paper is regulated by a galvanometer needle so that the turning on and off of incandescent lamps makes respectively an up or down irregularity in the line registered, while the length of line between the irregularities measures the length of time the lamps are on and off. The cut shows a galvanometer needle with an enlarged head, containing a hole *a*, through which a constant ray of light passes.

**333,816. Telephony**; James W. Bonta, Philadelphia, Pa., Assignor to J. Daniel Ely, trustee, same place. Embraces a method of transmitting speech by induced currents over a secondary circuit, which consists in causing



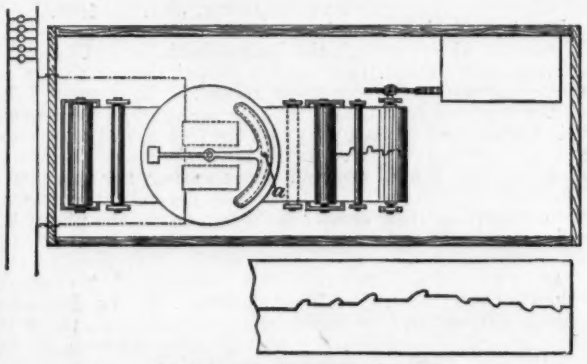
333,563. ARMATURE FOR DYNAMO.

the speech to vary the resistance, as well as to open and close the primary circuit associated with such secondary circuit.

**333,902. Dynamo-Electric Machine**; René Thurz, Geneva, Switzerland, Assignor by mesne assignments to A. de Meuron and Cuénod, of same place, and Geo. H. Benjamin, New York, N. Y. The armature consists of a drum upon which are disposed helices formed from a continuous wire and wound in consecutive order around the surface of the drum, the end of one helix forming the beginning of the next, and having their sides parallel to each other and to the axes of rotation, and whose ends pass over the ends of the drum as chords, dividing it into any equal number of parts.

**333,932. Telephone Receiver**; North Dowling, Philadelphia, Pa. Concentrically arranged magnets are combined with a diaphragm in such a manner that the various poles near the latter have opposite polarities.

**333,970. Circuit for Electric Railways**; Frank L. Pope, Elizabeth, N. J. He claims the combination of an electrically connected and insulated line of rails in a railroad track, a conductor for connecting said line of rails with a source of electricity, a normally open circuit controller placed in said conductor, an electro-



333,779. ELECTRICAL METER.

magnet for actuating said circuit controller, and an independent electric circuit for actuating said electro-magnet, which last-named circuit is completed by the presence of a vehicle on said insulated line of rails. It is not necessary to employ any means of insulating the opposite rails from each other or from the earth, except to place them upon the cross-ties of wood, as the loss by leakage is comparatively small, unless a considerable length of track is included in the section. The sections may, however, be made quite short where circumstances require it, and the leakage thus reduced to a minimum.

**333,975 Municipal Alarm Service**; William A. Stern, Pittsburgh, Pa., Assignor of half to Eugene Ingold, of same place. Consists in the use of one wire for transmitting several and distinct signals by means of separate instruments which are so differentiated that when one instrument is being used all of the others are inert, and so that no instrument is capable of transmitting more than its special signals.